In-Lieu Fee Program Draft Instrument for Indiana Stream & Wetland Mitigation Program

AUG. 4, 2015

Prepared for:

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AND

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INDIANA STREAM AND WETLAND MITIGATION PROGRAM
DRAFT IN-LIEU FEE PROGRAM INSTRUMENT

DATE SUBMITTED: 4 August 2015

I. INTRODUCTION

This document shall constitute the instrument (Instrument) that governs the establishment, operation and use of the Indiana Stream and Wetland Mitigation Program (IN SWMP) sponsored by the Indiana Department of Natural Resources (IDNR).

II. PURPOSE

The Indiana Stream and Wetland Mitigation Program (IN SWMP) will be used for compensatory mitigation for unavoidable impacts to waters of the United States (WOUS) and isolated wetlands in the State of Indiana. Permits are required by the U.S. Army Corps of Engineers (Corps) through Section 404 of the Clean Water Act (CWA) for the discharge of dredged or fill materials within WOUS, through Section 10 of the Rivers and Harbors Act for structures or work in or affecting navigable waters of the U.S., and by the Indiana Department of Environmental Management (IDEM) under Section 401 Water Quality Certification of the CWA and, for wetlands that are not WOUS, Indiana's State Isolated Wetlands law (Indiana Code 13-18-22).

All re-established, rehabilitated, enhanced or preserved aquatic resources on completed IN SWMP projects will be considered WOUS.

The objectives for the IN SWMP are as follows:

- Meet current and expected demand for mitigation credits.
- Achieve ecological success on a watershed basis by providing wetland and stream functions and services that are appropriate to the service area and by integrating IN SWMP projects with other conservation activities whenever possible.
- Provide an alternative to permittee-responsible, project specific, compensatory mitigation that will effectively replace functions and services lost through permitted direct and secondary impacts.
- Provide mitigation credits to resolve Section 401 and 404 of the CWA and Indiana's Isolated Wetland Permit enforcement cases.

This Instrument provides the IDNR with authorization to provide mitigation credits to Corps and IDEM permittees to be used as compensatory mitigation for Corps and IDEM permits, upon approval by the District Engineer (DE), or the Corps' official representative, at the Corps District with jurisdiction over the permitted activity and/or IDEM. Approval shall be in the form of a Corps and/or IDEM permit; the IDNR does not have the written or implied authority to approve Corps or IDEM permits.

III. PROGRAM OPERATION

A. INTERAGENCY REVIEW TEAM

The Corps will form an Interagency Review Team (IRT) comprised of the Corps (Louisville District (Chair), Chicago District and Detroit District), US Environmental Protection Agency (USEPA), US Fish and Wildlife Service (USFWS), IDEM, US Department of Agriculture Natural Resource Conservation Service (NRCS), US Forest Service (USFS) and representatives invited by the Corps from other federal, state, tribal, and local resource agencies that would have a substantive interest in the establishment and management of the Indiana Stream and Wetland Mitigation Program (IN SWMP) sponsored by IDNR. The Corps may designate different representatives of the agencies listed above and may invite additional members to serve on the IRT for specific IN SWMP mitigation projects (Mitigation Rule p. 19680 §332.8(b)).

1. Corps of Engineers:

   The Corps is responsible for consulting with the IRT in accordance with the requirements of 33 CFR §332.8, providing oversight of the IN SWMP, and ensuring compliance with the CWA Section 404 and the Rivers and Harbors Act Section 10.

   There are three Corps Districts covered by this Instrument – Louisville, Chicago, and Detroit Districts. Louisville District is the lead District and will serve as the District Engineer (DE) and is responsible under this Instrument for communicating with the IDNR regarding programmatic and instrument decisions and coordinating with the IRT. However, the Chicago and/or Detroit District may request that responsibility be delegated for IN SWMP mitigation projects that are proposed to be located within their respective regulatory program area.

2. IRT Members

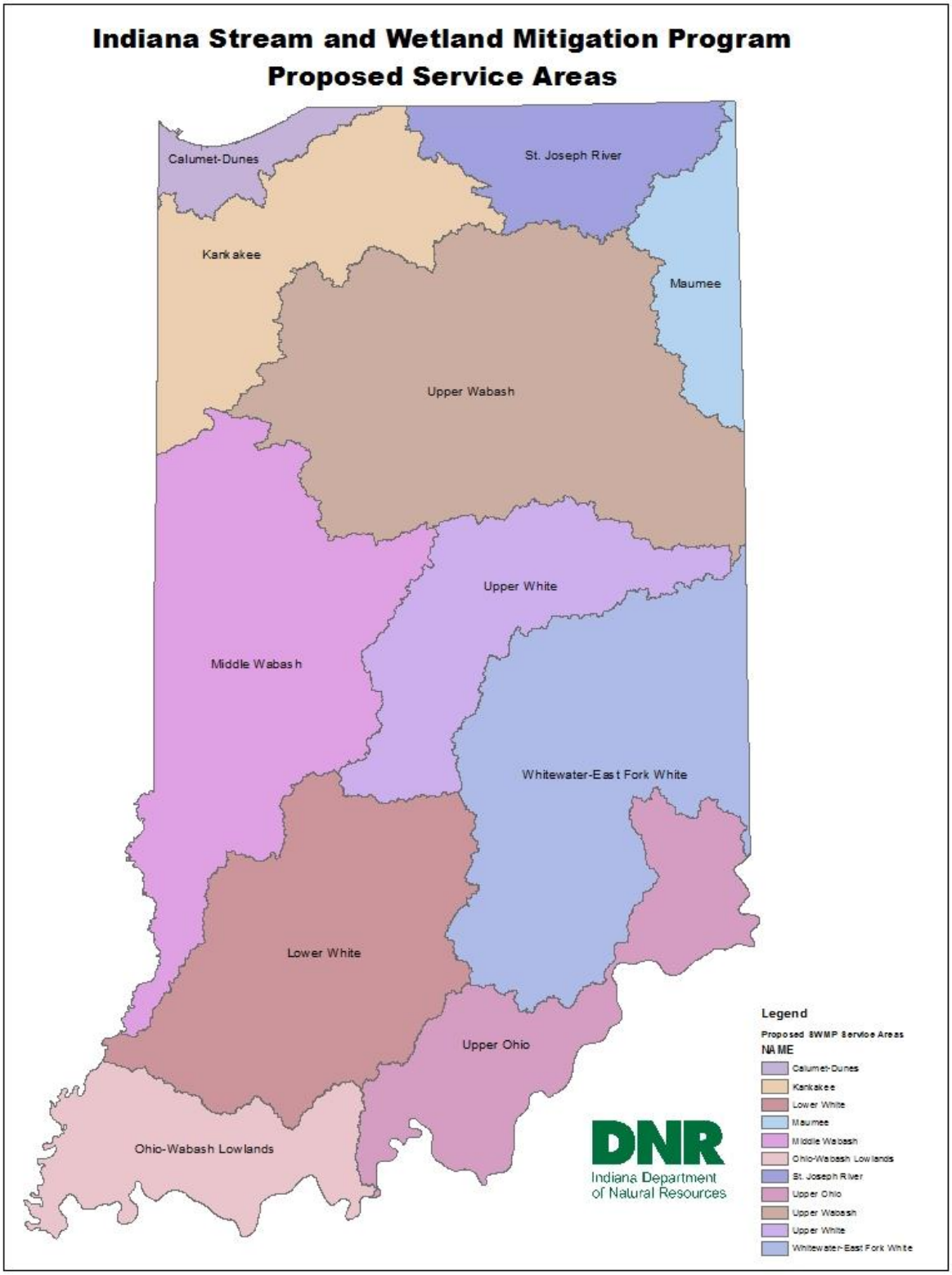
   The IRT members are responsible for advising the Corps in assessing monitoring reports, recommending remedial or adaptive management measures, and providing input on credit releases, credit release schedules, and Instrument modifications. The procedures for IRT member review and comment in 33 CFR §332.8 shall apply. IRT members whose agency has a direct or indirect role in funding, contracting, implementation or other financial involvement with a specific project shall be recused.

B. SERVICE AREAS

The IN SWMP will operate statewide in the 11 service areas listed below. The individual service areas consist of the listed 8-digit HUC (hydrologic unit code) watersheds, or portions of said 8-digit HUCs located within the State of Indiana.

(a) Calumet-Dunes (04040001, 07120003)
(b) Kankakee (0712001, 0712002)
(c) St. Joseph River (0405001)
(d) Maumee (04010003, 04010004, 04010005, 04010007)
(e) Upper Wabash (05120101, 05120102, 05120103, 05120104, 05120105, 05120106, 05120107)
(f) Middle Wabash (05120108, 05120109, 05120110, 05120111, 05120113, 05120203)
(g) Upper White (05120201)
(h) Whitewater-East Fork White (05080001, 05080002, 05080003, 05120204, 05120205, 05120206, 05120207)
(i) Lower White (05120202, 05120208, 05120209)
(j) Upper Ohio (05090203, 05140104, 05140101)
(k) Ohio-Wabash Lowlands (05120113, 05140201, 05140202)

The Descriptions of the geographic service area(s) and their basis are provided in the Compensation Planning Framework (Appendix B).


Indiana Stream and Wetland Mitigation Program
Proposed Service Areas
Calumet-Dunes
St. Joseph River
Kankakee
Maumee
Upper Wabash
Upper White
Middle Wabash
Whitewater-East Fork White
Lower White
Upper Ohio
Ohio-Wabash Lowlands
DNR
Indiana Department of Natural Resources
Legend
Proposed SWMP Service Areas
NAME
Calumet-Dunes
Kankakee
Lower White
Maumee
Middle Wabash
Ohio-Wabash Lowlands
St. Joseph River
Upper Ohio
Upper Wabash
Upper White
Whitewater-East Fork White

C. CREDITS

1. Allocation of Advance Credits

Table 1 below shows the advance credits that will be allocated to the INSWMP upon approval by service area.

The allocation of credits was determined by undertaking an analysis of the required mitigation for Corps and IDEM permits from 2006 to 2013. The analysis determined the annual average for each service area and the variability (ie. standard deviation) across the service areas in the annual averages. These were combined to determine an estimated annual absorption of mitigation credits for each service area.

A model was built based upon the proposed credit release schedule in Paragraph D.2 to determine the required multiplier of the estimated annual absorption. A multiplier of 3.0 was determined to be necessary so that the amount of advance credits was sufficient to have IN SWMP credits available until IN SWMP mitigation projects credits are released.

The results of this initial analysis were then weighed against several factors by the IDNR:

- urbanization patterns,
- current and projected availability of mitigation bank credits, and
- a minimum value of 37,500 stream credits and 75 wetland credits, this is to ensure the ability of the INSWMP, when environmentally preferable, to provide compensatory mitigation for large scale projects that would exceed or use all available advance credits.

These factors either decreased or increased results of the initial analysis, resulting in the allocation of advance credits shown in Table 1.

Service Area	Stream Credits	Wetland Credits
Calumet-Dunes	37,500	125
St. Joseph River (Lake MI)	37,500	75
Maumee	37,500	75
Kankakee	37,500	75
Upper Wabash	50,000	75
Middle Wabash	60,000	75
Upper White	60,000	200
Whitewater-East Fork White	37,500	75
Lower White	125,000	125
Upper Ohio	37,500	75
Ohio-Wabash Lowlands	60,000	100

Table 1 – Advance Credits by Service Area

2. Credit Sales

The IDNR may sell or transfer available Advance or Released credits to Corps and/or IDEM permittees to be used as compensatory mitigation for Corps and/or IDEM Permits, upon approval by the Corps and/or IDEM. The approval will be in the form of a Corps and/or IDEM permit.

Once sold to permitee, mitigation credits may not be re-funded, re-sold or transferred to other entities except with the approval of the Corps and/or IDEM. Mitigation credit ledgers shall be updated within 30 days of approved releases or sales and reviewed annually by the IRT Chair.

The permittee shall provide the IDNR with sufficient information to account for impacts and the required mitigation for each Corps and/or IDEM permit in which the permittee is approved to purchase mitigation credits from the IDNR. The documentation should include the following:

i. Corps District and IDEM project managers
ii. Corps permit number and date of authorization
iii. IDEM Water Quality Certification (WQC) or isolated wetlands permit number and date of issuance
iv. Service Area
v. Project name
vi. Permittee information (name, address, phone number)
vii. Project Coordinates (Latitude and Longitude)
viii. Linear feet and/or acres of impacted WOUS and/or isolated wetland
ix. Functional or other mitigation units lost
x. Type of waters impacted
xi. The number of functional or other mitigation units required of the IDNR to compensate for the impacts, including temporal loss and/or cumulative impacts
xii. Other information as deemed necessary by the Corps and/or IDEM

Since 33 CFR §332.3(b)(2) establishes a preference for mitigation bank credits, IDNR will not sell advance credits for the purposes of compensatory mitigation within the approved service area of an existing mitigation bank when appropriate released credits are currently available without approval of the Corps and/or IDEM. However, per 33 CFR §332.3(b)(2), the sale of released credits will not be subject to this prohibition.

3. Credit Cost

Fees for the IN SWMP will be determined solely by IDNR (33 C.F.R. §332.8(o)(5)(i)). The fees shall be subject to change as determined by IDNR at their sole discretion. Changes in fees shall not constitute a modification of this Instrument.

An analysis was completed to determine the initial fees for each service area. First, the analysis established a minimum target project size based upon three times the average annually required mitigation for each service area and an assumption that only a certain percentage (60%) of this mitigation would be accomplished by utilizing the INSWMP.

Based upon this target project size, the expected costs associated with the restoration, establishment, enhancement, and/or preservation of aquatic resources in each service area meeting the requirements of this instrument was determined. These costs shall be based on full cost accounting, and include land acquisition, project planning and design, construction, materials, labor, legal fees, monitoring, adaptive management measures, program implementation, contingency costs over the life of the project, establishment of a long-term management and protection fund, financial assurances, and an administrative fee. Table 2 gives an approximate breakdown of the project costs.

Project Component	Wetland	Stream
Land Acquisition	20 – 35%	10 – 28%
Mitigation Plan Development / Proj. Mgm't	2 – 7%	6 – 16%
Permanent Protection	5 – 10%	1 – 5%
Restoration	12 – 17%	15 – 30%
Monitoring / Adaptive Mgm't	5-10%	2 – 10%
Long Term Management	15%	15%
Contingencies	7 - 10%	7 – 10%
IN SWMP Administration Fee	15%	15%

Table 2 – INSWMP Project Component Breakdown

Finally, the estimated costs were divided by the target project size to determine the draft fee schedule for the IN SWMP shown in Table 3.

An official fee schedule will be released after the program is approved. As IN SWMP mitigation projects are undertaken and the program has operating experience, the fee schedule will be updated based upon refined estimates of the target project sizes, costs and anticipated credit sales.

Service Area	**Stream Credit Price**	**Wetland Credit Price**
Calumet-Dunes	$636.00	$50,000.00
St. Joseph River (Lake MI)	$545.00	$71,000.00
Maumee	$409.00	$59,000.00
Kankakee	$636.00	$71,000.00
Upper Wabash	$340.00	$59,000.00
Middle Wabash	$327.00	$59,000.00
Upper White	$306.00	$53,000.00
Whitewater-East Fork White	$363.00	$59,000.00
Lower White	$294.00	$53,000.00
Upper Ohio	$363.00	$59,000.00
Ohio-Wabash Lowlands	$413.00	$59,000.00

Table 3 – Draft Price Schedule by Service Area

4. Credit Types and Units

Credit Type	Credit Unit
Emergent Wetland	Acre
Scrub-Shrub Wetland	Acre
Forested Wetland	Acre
Perennial Stream	Linear Feet
Intermittent Stream	Linear Feet

Table 4 – IN SMWP Credit Types and Units

If the Corps and/or IDEM adopt a new functional assessment methodology, at a future date, which requires IDNR to adapt the above credit unit definitions, this will not constitute a modification of this Instrument.

5. Fulfillment and Reallocation

Mitigation credits will be identified as:

Released Credits are credits associated with an approved mitigation plan for IN SWMP mitigation projects that are available for sale upon achievement of certain performance measures and milestones.

Advance Credits are any credits made available prior to being fulfilled by released credits from an IN SWMP mitigation project.

Credits will be accounted for by service area.

Released Credits will first be used to fulfill any Advance Credits that have already been provided within the service area before any remaining Released Credits can be sold or transferred to permittees.

Once previously provided Advanced Credits have been fulfilled, an equal number of Advance Credits will be re-allocated for sale or transfer to fulfill new mitigation requirements consistent with this Instrument.

D. COMPENSATORY MITIGATION PROJECT CREDITS

1. Determination of Credits

Mitigation credits generated by IN SWMP mitigation projects will be determined as part of the mitigation plan approval and credit release process for IN SWMP mitigation

projects. Mitigation credits will be determined in accordance with 33 C.F.R. §332.8(o). In order to generate released mitigation credits, all IN SWMP mitigation projects must have an approved Mitigation Plan.

In general credits generated by IN SWMP mitigation projects will be calculated according to the following schedule:

- Restoration (Re-establishment) – 1 to 1
- Restoration (Rehabilitation) – 0.7 to 1
- Establishment – 1 to 1 (at the time all ecological performance standards are met)
- Enhancement – 0.5 to 1 thru 0.7 to 1
- Preservation – 0.1 to 1

2. Schedule for Credit Release

Released Credits from IN SWMP mitigation projects shall be tied to ecological performance-based milestones.

IN SWMP mitigation projects, other than preservation, will utilize the following credit release schedule:

- 25% mitigation credit release after receipt of the signed and recorded conservation easement or other approved long term site protection instrument
- 15% additional mitigation credit release (40% cumulative) upon issuance of Corps and/or IDEM permit plus written acceptance from the Corps and/or IDEM of the "As Built" Report
- 40% additional mitigation credit release, incrementally upon proof that Ecological Performance Standards are met at end of Year 1 (10%), Year 2 (10%), Year 3 (10%) and Year 4 (10%)
- 20% additional mitigation credit release (100 % cumulative) upon proof that Ecological Performance Standards of year five are met. Final release is contingent upon final accounting of mitigation credits and written release from compliance monitoring from the Corps and/or IDEM in consultation with the IRT

In the case of preservation, 100% of the mitigation credits will be released upon securing the site and finalizing the site protection.

Deviations from these release schedules may be approved by the Corps on a case-by-case basis after consultation with the IRT and shall be included in the approved Project Mitigation Plan for the compensatory mitigation project. Approval of deviations from the above release schedule shall be based on past and current performance, specific site

characteristics or factors that would affect risk, or other considerations as determined by the Corps.

3. Credit Release

   The IDNR shall submit documentation to the Corps demonstrating that the ecological performance-based milestones have been achieved and shall request release of the mitigation credits.

   The Corps, in consultation with the IRT, shall approve the release of mitigation credits for a compensatory mitigation site per 33 CFR §332.8(o)(9).

E. CREDIT/DEBIT ACCOUNTING AND REPORTING

The IDNR shall establish and maintain appropriate ledgers and provide an annual report in accordance with 33 CFR §332.8(i)(3) & (q)(1).

Individual ledgers for each service area shall track:

1. Credit Accounting - including allocated advance credits, advance credits sold, advance credits fulfilled, released credits, released credits sold, and current balance of credits available; and

2. Credit Transactions –the permit authorizing the associated impact and its date of issuance, project name, permittee name, impact location, acres or linear feet impacted, aquatic resource impacted, functional units lost and required for mitigation, amount paid to the IN SWMP and the date the funds were received.

Each IN SWMP mitigation project shall have a separate ledger that tracks Generated and Released Credits for that site.

Credit ledgers and annual reports shall be provided to the Corps and IRT by March 31 of each year for the previous calendar (January through December) year. The Corps may consider granting an extension of this deadline upon request by the IDNR.

F. IN SWMP COMPENSATORY MITIGATION PROJECTS

1. Mitigation Plan

   The IDNR will submit a Project Mitigation Plan for each IN SWMP mitigation project to the Corps. The Project Mitigation Plan must include the information required in 33 CFR §332.8(j) and shall be supported by the Compensation Planning Framework (CPF).

2. General Considerations

The general considerations for compensatory mitigation set forth in 33 CFR §332.3 shall be the basis for evaluating IN SWMP mitigation projects submitted by the IDNR to the Corps for approval.

3. Approval

   The Corps must approve all IN SWMP mitigation projects as modifications to this Instrument. IN SWMP mitigation projects will be reviewed and approved in accordance with 33 CFR §332.8. Projects requiring Corps authorization will be approved following current Corps procedure. The approved Mitigation Plan for each IN SWMP mitigation project will be incorporated into Appendix C.

4. Implementation

   The IDNR is responsible for the implementation, long-term management, and any required remediation of IN SWMP mitigation projects, even if those activities are conducted by other parties.

   When IDNR utilizes released mitigation credits from a Corps-approved mitigation bank, all further responsibility, related to those credits will be transferred to the Sponsor of the mitigation bank.

5. Monitoring

   The IDNR is responsible for monitoring IN SWMP mitigation projects. Monitoring shall be in accordance with the approved Mitigation Plan for each IN SWMP mitigation project to ensure performance based milestones are achieved.

   Monitoring reports shall be submitted in accordance with the approved Mitigation Plan.

6. Long Term Management

   IDNR shall be responsible for developing and implementing a long-term protection and management plan for each IN SWMP mitigation project.

   Projects shall be designed, to the maximum extent practicable, to require minimal long-term management once ecological performance standards have been achieved.

   The long-term management plan for each project will be approved by the Corps. The approved plan shall identify the party responsible for both the long-term protection and management of the project site.

The long-term management responsibilities may be transferred from the IDNR to another party after review and approval of the Corps. The long-term management plan developed for each project will include a description of anticipated management needs with an annual cost estimate and an identified funding mechanism to cover the annual cost estimate. The funding mechanism shall be in place prior to the final release of credits.

7. Site Closure

IDNR shall request closure of each IN SWMP mitigation project when the ecological performance standards have been met, all monitoring has been completed and reporting accepted.

Upon establishment of any agreements or arrangements required by the long term management plan and/or site protection, IDNR may request closure of the compensatory mitigation project.

The Corps shall, after consulting with the IRT, issue written notice of closure if all requirements are met.

Upon closure, any remaining released credits would no longer be available to sell, transfer or fulfill advanced credits.

Any remaining financial assurances for the compensatory mitigation project shall be released for use by IDNR as allowed by this Instrument.

G. ACCEPTANCE OF COMPENSATORY MITIGATION RESPONSIBILITIES

1. The permittee shall retain responsibility for providing the compensatory mitigation until the Corps and/or IDEM has received the appropriate documentation that confirms the IDNR has accepted the permit mitigation responsibilities and received payment.

2. The IDNR assumes responsibility for the mitigation requirements of permittees who are issued Corps and/or IDEM permits for which mitigation credits are purchased from the IDNR as compensatory mitigation for impacts authorized by the Corps and/or IDEM by a permit.

3. The IDNR shall provide the Corps and/or IDEM with documentation confirming the IDNR has accepted responsibility for providing the required compensatory mitigation for a Corps and/or IDEM permit.

   This documentation will consist of a letter to the permittee, signed by the IDNR, identifying the permit number(s) and stating the number and type of mitigation credits

that have been secured from the IDNR. The IDNR shall also provide a copy of this letter to the Corps and/or IDEM.

4. The IDNR shall retain the right to refuse to sell credits, temporarily shut down a service area, or suspend credit sales at their discretion.

5. The IDNR may purchase mitigation credits from a Corps-approved mitigation bank. In these cases, the instrument(s) governing the mitigation bank shall apply, including the transfer of mitigation liability from the IDNR to the bank once the mitigation credits have been purchased.

H. COMPENSATION PLANNING FRAMEWORK (CPF)

1. The CPF for the IN SWMP is attached as Appendix B and will be used to direct the selection and implementation of mitigation projects, and describes the geographic service areas for the IN SWMP and their basis.

2. Modification of the CPF is considered a significant modification to this Instrument and will be made following the procedures in 33 CFR §332.8(d).

I. TIMING OF COMPENSATORY MITIGATION PROJECTS

1. In general, implementation of the mitigation plan for IN SWMP mitigation projects will occur after sufficient funds are available in a service area to undertake a project. Permanent protection and initial physical or biological improvements shall begin by the end of the third full growing season after Advance Credits are sold in a specific service area.

   Alternative compensatory mitigation, including the purchase of mitigation credits from a Corps-approved mitigation bank, shall be provided when the IDNR does not provide mitigation within three growing seasons after the first Advance Credit is sold in a service area unless the IDNR proposes and the Corps agrees that more time is needed.

2. The IDNR may identify, design, and/or implement IN SWMP mitigation projects in advance of impacts.

3. The timing of implementing mitigation project plans may be affected by IRT consultation, procurement procedures, land acquisition, permitting, compliance with other environmental regulations, and other factors which may necessitate Corps approval of additional time needed to plan and implement IN SWMP projects.

IV. PERMANENT PROTECTION

A. Each IN SWMP mitigation project site (the aquatic habitats, riparian areas, buffers and upland areas that comprise the overall compensatory mitigation project) will be protected with a real estate instrument or other mechanism, as appropriate, per 33 CFR §332.7.

B. The approved mitigation plan for each IN SWMP mitigation project will include the required site protection.

C. Unless approved by the Corps, the IDNR shall not implement mitigation on sites where oil, gas, mineral, timber, or other land use rights or interests are severed from fee ownership, and where such rights could threaten the long term success, and threaten the ecological value, of the IN SWMP mitigation project site.

D. Mitigation protection shall maintain the aquatic resources and associated habitats that are preserved, restored, enhanced or created for each IN SWMP mitigation project site. The protection shall be bound on all assigns and successors.

E. Any activity which is inconsistent with the purposes of an IN SWMP mitigation project shall be prohibited on the IN SWMP project site, this includes:
   a. subdivision of the site into two or more parcels, with the exception of any future dedication of all or part of the site as a nature preserve or other such classification;
   b. any residential, commercial, agricultural or industrial use or activity on the site;
   c. the maintenance of any new man-made modifications such as buildings, structures, boat ramps, or other improvements, unless part of the approved mitigation plan;
   d. mining, exploration for, or extraction of oil, gas, or other minerals, hydrocarbons, soils or other materials that disturbs the surface or aquatic resources of the site;
   e. the dumping or storage or disposal of trash, garbage, sewage, debris, or other refuse of any nature;
   f. the cutting or harvesting of trees or wood products, unless approved as part of the approved mitigation plan and/or long term management plan;
   g. earth moving, grading, dredging or filling, unless approved as part of the approved mitigation plan;
   h. the construction, maintenance, or erection of any commercial advertisement, sign or billboard, except for posting of signs depicting the project site, including boundary, interpretive or directional signs;
   i. the construction or extension of roads or utility systems, outside of existing easements or right-of-ways, unless court ordered;
   j. use of horses, ponies, bicycles or motorized vehicles, such as cars, trucks, snowmobiles, dune buggies, ATVs or motorcycles, except the use of vehicles necessary to complete the construction or maintenance of improvements in the approved mitigation plan;
   k. other activities, actions, or uses that would be detrimental or adverse to soil and water conservation values.

F. The following activities shall be allowed on IN SWMP mitigation project sites:
   a. natural resources inventories or monitoring of species of plants and animals;
   b. installation of signs relating to the mitigation project, depicting designations or classifications, including interpretive signs or directional signs;
   c. non-commercial, non-developed recreational activities including, hunting, fishing, hiking, nature viewing and photography, and other low impact, non-extractive uses not inconsistent with the mitigation project that will not be detrimental to the mitigation project achieving its required ecological performance standards;
   d. installation and maintenance of trails to provide access to the site, as approved in the mitigation plan;
   e. management of the site to restore and /or enhance native plant and animal communities, including control of invasive plant and animal species, considered noxious under state law or considered detrimental to the conservation values on the site according to the approved mitigation plan, invasive plant species control and removal may be by manual or mechanical methods, by the use of herbicides or bio-controls and/or prescribed burning, invasive animal species control may be by trapping or hunting pursuant to applicable laws and regulations;
   f. management of the site to restore and/or enhance aquatic resources and to alter the vegetation and hydrology, including diverting or affecting the natural flow of surface or underground water into, within, or out of the site, or dredging, channeling, filling, pumping, diking, impounding, or other related activities according to the approved mitigation plan;
   g. entry and use, and all other activities not expressly prohibited by the approved mitigation plan that are not inconsistent with the mitigation project.

G. No human activities that may require a Corps and/or IDEM permit for impacts to aquatic resources shall occur on an IN SWMP project site without obtaining said permits and providing mitigation for the direct loss of the aquatic resource, past impacts being mitigated for by the aquatic resources, and all associated temporal losses.

V. FINANCIAL ASSURANCES

A. The IDNR's financial obligation for the IN SWMP will be limited to the funds in the IN SMWP Program Account held by the Indiana Natural Resource Foundation.

B. The approved mitigation plan for each IN SWMP mitigation project will specify the amount of funds to be earmarked and held in the IN SWMP Program Account to provide the required financial assurances for that site. The long term management funding mechanism may be transferred to a third party upon approval.

C. If sufficient funds are not available in the IN SWMP Program Account to provide the required financial assurances, IDNR will provide financial assurances in a form according to 33 CFR §332.3(n)(2).

D. The approved mitigation plan for each IN SWMP mitigation project will have an identified schedule to release the financial assurances as the project site meets its approved ecological performance standards.

VI. MODIFICATION OF THIS INSTRUMENT

A. Modification of this Instrument shall follow the procedures set forth in 33 CFR §332.8(g).

B. For purposes of this Instrument the following changes are generally considered not to be significant and may warrant application of the streamlined review process:

1. IN SWMP mitigation project site approval
2. Modifications in the allocation of Advance Credits

The streamlined review process will follow the procedures set forth in 33 C.F.R. §332.8(g)(2). The Streamlined Review Process will be initiated when the Corps notifies the IDNR and IRT that the process has begun and distributes the amendment or modification. IRT consultation and coordination will commence no sooner than five days after distribution of the amendment or modification to the IRT.

C. The Compensation Planning Framework (Appendix A) utilizes various sources of external information/data in its mitigation approach and prioritization. These sources of information/data are expected to be updated or modified over time by the external entities responsible for maintaining these sources of information. The IDNR's use of updated or modified information from these external sources in the application of its CPF is not considered a modification of the CPF or this Instrument.

VII. DEFAULT, SUSPENSION, AND TERMINATION

A. When the Corps determines that the Indiana Stream and Wetland Program (IN SWMP) is not meeting or complying with the terms of this Instrument, the Corps will take appropriate action. Such actions may include, but are not limited to: suspending IN SWMP credit sales, decreasing the allocation of Advance Credits, requiring adaptive management actions, suspending approval of new mitigation projects, directing funds to alternative mitigation, terminating this Instrument, or other actions as approved by the Corps.

B. Termination:

1. Either the Corps or IDNR may terminate this Instrument. Termination procedures shall be commenced upon written notice of either party's intent to terminate this Instrument.

2. Within 90 days of the written notice to terminate, the IDNR shall provide the following:

    a. An accounting of all monies and outstanding obligations by service area and for each mitigation project;

    b. The status of all approved mitigation projects, including the number of credits released, the remaining projected credits to be generated by each project, the extent to which each project is meeting the performance standards and measures that will be taken to ensure the performance standards are met;

    c. The status of the long term management plans and funding, and the measures that will be taken to ensure that the plans can be implemented.

3. The Corps, after consulting with the IRT, will determine if the measures proposed by IDNR are adequate and determine the final closure plan for the IN SWMP.

4. If no released credits from a mitigation project have been generated and subsequently used to fulfill advance credits or otherwise transferred, the site protection instrument may be vacated with written approval of the Corps.

C. Remaining Funds

1. In the case of default, any remaining IN SWMP funds after fulfilling all obligations shall be transferred to another governmental or non-profit natural resource entity for implementation of stream and wetland mitigation projects including funds necessary for long-term management; funds may also be used to purchase mitigation bank credits;
2. In other cases, remaining IN SWMP funds may be utilized by IDNR for further compensatory mitigation activities.

VIII. DISASTERS

A. In the event of a natural or human caused disaster or a deliberate and unlawful act occurs which impacts an unclosed IN SWMP mitigation project, the IDNR shall notify the Corps within 30 days of discovery of the impacts. The notice shall identify the disaster, its impacts, and any measures taken to stabilize the IN SWMP mitigation project site.

Should the Corps, in consultation with the IRT, concur that the disaster was beyond the control of the IDNR to prevent or mitigate, the IDNR may request and the Corps may

approve changes to the construction, operation, performance standards or credit release schedule for the IN SWMP mitigation project.

Should the disaster cause substantial damage:

1. The use of released credits from the IN SWMP mitigation project shall be temporarily suspended pending determination by the Corps:
   a. Whether the surviving mitigation provided will cover the credits used to date, and
   b. Whether the use of credits can continue despite the damages.

2. The IDNR will implement an adaptive management plan, approved by the Corps. The plan shall identify an updated monitoring and reporting plan, performance criteria and credit release schedule.

3. If an adaptive management plan is not implemented within one year following the disaster event, the IN SWMP mitigation project shall be closed, and any outstanding credit obligations for the site, will be added to those for the service area where the project site is located.

B. If a natural or human disaster occurs which impacts a closed IN SMWP project site, an adaptive management plan will be developed per the long term management plan. Funds from the long term management funding mechanism will be utilized for these activities.

IX. POINTS OF CONTACT

The points of contact for written communication among the parties are as follows or as otherwise specified in the future by written notice to all parties:

Corps of Engineers

U.S. Army Corps of Engineers
Chief, Regulatory Branch
Louisville District Corps of Engineers
OP-FN, Room 752
P.O. Box 59
Louisville, KY 40201-0059
PHONE: (502) 315-6685

U.S. Army Corps of Engineers
Chief, Regulatory Branch
Detroit District Corps of Engineers
477 Michigan Avenue
Detroit, MI 48226-2550
PHONE: (313) 226-2218

U.S. Army Corps of Engineers
Chief, Regulatory Branch
Chicago District Corps of Engineers
231 South LaSalle Street, Suite 1500
Chicago, IL 60604
PHONE: (312) 846-5530

Sponsor

Indiana Department of Natural Resources
Carl Wodrich
Director of Ecological Services
402 Washington Street, W261
Indianapolis, IN 46204
317-232-1291
CWodrich@dnr.IN.gov

Sponsor's Fiscal Agent
Indiana Natural Resources Foundation
Bourke Patton, Executive Director
402 Washington Street, W256
Indianapolis, IN 46204
317-234-5447
BPatton@dnr.IN.gov

IRT Members

IDEM, Office of Water Quality
Marty Maupin
100 North Senate Avenue
Indianapolis, Indiana 46204
317-233-2471

USFWS, Bloomington Indiana Field Office
Marissa Reed
620 South Walker Street
Bloomington, Indiana 47403-2121
812-334-4261

USEPA, Region 5, WW-16J
Sue Elston
77 West Jackson Boulevard
Chicago, Illinois 60604
312-886-6833

USDA-NRCS
Albert Tinsley
6013 Lakeside Boulevard
Indianapolis, IN 46278-2933
317-295-5856

X. EFFECTIVE DATE:

This agreement shall become effective when signed by the Louisville, Chicago, and Detroit Districts of the U.S. Army Corps of Engineers, IDEM, and the IDNR. IRT members are invited to sign this Instrument as an indication of their agreement to the terms of this Instrument. The decision of an IRT Member not to sign this Instrument does not negate the effectiveness of this Instrument. The Corps retains the final authority for approval of this Instrument.

XI. CORPS OF ENGINEERS & IDNR SIGNATURES

_____

Name Date
Chief, Regulatory Branch
Louisville District

_____

Name Date
Chief, Regulatory Branch
Chicago District

_____

Name Date
Chief, Regulatory Branch
Detroit District

_____

Cameron F. Clark Date
Director
Indiana Department of Natural Resources

XII. INTERAGENCY REVIEW TEAM SIGNATURES

_____

Thomas W. Easterly Date
Commissioner
Indiana Department of Environmental Management

_____

Name Date
Address

_____

Name Date
Address

_____

Name Date
Address

_____

Name Date
Address

XIII. IN SWMP APPENDICES

APPENDIX A. IN SWMP FINANCIAL ACCOUNTING

A.1 FISCAL AGENT

The Indiana Natural Resources Foundation (INRF) will serve as fiscal agent for the Indiana Stream and Wetland Program (IN SWMP). The INRF will receive and safeguard all IN SWMP funds. The INRF will disburse IN SWMP funds only according to the terms of this Instrument. The INRF will maintain all financial records relating to the IN SWMP for three years after the termination of the program.

A.2 FINANCIAL ACCOUNTS

A.2.1 IN SWMP Account

The INRF will establish the IN SWMP Account at an FDIC member financial institution upon approval of the IN SWMP and prior to the sale of any advance credits.

All mitigation payments shall be deposited into the IN SWMP Account held by the INRF. The IN SWMP Account is to be used solely for the purposes and benefit of Indiana stream and wetland mitigation projects. All monies that may be generated from the sale or disposal of property, equipment, materials or other items purchased using in-lieu fee funds shall be reimbursed and deposited in the IN SWMP Account for the sole use and benefit of the IN SWMP and shall not be diverted for other uses. The IN SWMP Account will be used for in-lieu fee mitigation activities, including: land acquisition, project planning and design, construction, plant materials, labor, legal fees, monitoring, remediation and adaptive management activities, long term management, administration, or other costs necessary to complete mitigation projects. The pricing of credits will be set at an amount sufficient to fund all costs associated with operation of the IN SWMP and implementation of mitigation projects.

Interest and earnings shall remain in the IN SWMP Account for use solely by and for the purposes of the IN SWMP and providing compensatory mitigation for Corps and/or IDEM permits. Funds in the IN SWMP Account will remain in the account at the end of the state's fiscal year and will not revert to any other funds.

The following activities shall be tracked or accounted for separately in the IN SWMP Account:

(a) Administration

(b) Service Areas (in-lieu fee project funds)
(c) Reserve

A.2.2 Administration

The credit costs include an amount to fund the administration of the IN SWMP. 15% of each credit sold plus an equal amount of any interest accruing in the IN SWMP Account shall be used to fund administration tasks including, but not limited to, tasks completed by IDNR staff, INRF staff, and/or professional services required to carry out operation of the IN SWMP program.

IDNR may withdraw Administration funds at their discretion without the approval of the Corps or IRT.

Administration funds shall be tracked separately from the Service Area funds and the Reserve funds.

A.2.3 Service Areas

Funds to implement IN SWMP mitigation projects shall be deposited into the IN SWMP Account and tracked by Service Area. These funds will be used to implement compensatory mitigation projects including locating and identifying, planning, acquisition, site protection, design, construction, performance monitoring, contingency, long term management funding mechanisms, and/or other activities. The Service Areas are listed below and discussed in detail in Appendix B.

(a) Calumet-Dunes
(b) Kankakee
(c) St. Joseph River (Lake Michigan)
(d) Maumee
(e) Upper Wabash
(f) Middle Wabash
(g) Upper White
(h) Whitewater-East Fork White
(i) Lower White
(j) Upper Ohio
(k) Ohio-Wabash Lowlands

IDNR may withdraw funds from the IN SWMP Account as authorized under the approved mitigation project plans.

IDNR may request authorization from the Corps to withdraw funds for locating and identifying, planning and gaining approval of IN SWMP mitigation projects prior to approval of a mitigation plan for said project sites.

If released credits from compensatory mitigation projects within a Service Area exceed those required to fulfill advance credits provided, the Sponsor may request to re-designate excess Service Area funds as Reserve funds.

Service Area funds shall be tracked separately from the Administrative funds and the Reserve funds.

A.2.4 RESERVE FUNDS

A "Reserve" will be established in the IN SWMP Account. The Reserve will be maintained by the interest that has accrued to the IN SWMP Account and from a percentage for contingency of each credit sold.

The Reserve shall be used for contingency actions related to disasters, long-term management, site protection, and provide the required financial assurances for each IN SWMP mitigation project as required by its approved mitigation plan.

The use of Reserve funds shall be subject to the approval of the Corps in consultation with the Sponsor except for minor actions that do not require a permit, such as long-term management plan activities, fence repair, etc. All activities shall be reported to the Corps.

The Reserve shall have a limit on its balance equal to $3,000,000 plus the total amount of the required financial assurances for the IN SWMP mitigation projects as detailed in their approved mitigation plans.

This limit may be adjusted with approval of the Corps and will not constitute an instrument modification. Funds in excess of the limit shall be used by the Sponsor to implement compensatory mitigation projects. Released credits from compensatory mitigation projects funded with excess Reserve funds may be used to fulfill advance credit sales or sold or transferred to permittees. Funds from the sale of these credits shall be deposited back into the Reserve.

Reserve funds shall be tracked separately from the Service Area funds and the Administrative funds.

A.3 FINANCIAL LEDGER

The INRF will maintain a financial ledger that includes all income received, disbursements and interest earned by the IN SWMP Account tracked separately by each type of activity:

Administrative, Service Areas and Reserve.

A detailed ledger of all program expenditures will be maintained.

A.4 FINANCIAL REPORTING

A.4.1 ANNUAL REPORTS

The Sponsor will submit an Annual Financial Report to the Corps and IRT by March 31 for the previous calendar year. The Annual Financial Report will include the following:

(a) Income Received
(b) Disbursements made
(c) Balance of the Administrative funds
(d) Balance of the Service Area funds and summary of outstanding tasks for approved IN SWMP mitigation projects
(e) Balance of Reserve funds and summary of the financial assurance obligations
(f) Other information deemed necessary by the Corps

A.4.2 FINANCIAL REPORTING

All books, accounts, reports, files and other records pertaining to the IN SWMP shall be retained and made available at reasonable times for inspection by the Corps. The IDNR shall conduct independent financial reviews of the IN SWMP. The frequency, reporting standards and record keeping requirements shall be consistent with the State of Indiana standards and requirements.

APPENDIX B. IN SWMP COMPENSATION PLANNING FRAMEWORK

APPENDIX B: COMPENSATION PLANNING FRAMEWORK (CPF)

CPF APPLICABILITY AND MITIGATION RULE COMPONENTS

The compensation planning framework adopts a landscape-watershed approach to selecting and implementing IN SWMP mitigation projects that restore, enhance, establish or preserve aquatic resources under the IN SWMP program. This framework will be used to identify, evaluate, and screen potential IN SWMP mitigation projects and will be referenced in future Project Mitigation Plans. The compensation planning framework includes the following elements [33 CFR §332.8 (c)]:

1. Service Areas
2. Statewide Aquatic Resource Threats
3. Historic Aquatic Resource Loss / Current Conditions
4. Prioritization Strategy
5. Preservation Objectives
6. Private and Public Stakeholder Involvement
7. Long-Term Protection and Management
8. Periodic Evaluation Strategy
9. Resource Goals and Objectives

ELEMENT 1. SERVICE AREAS

Description

The IN SWMP will operate in 11 service areas listed below. The 8-digit HUC was used as the basic unit for constructing the service areas. Two of the service areas are sized at an 8-digit HUC scale; the remaining service areas were configured by combining multiple 8-digit HUC watersheds. The following service areas were chosen based on a combination of watershed boundaries and the likelihood of future wetland and stream impacts and potential mitigation opportunities. Ecoregions were also considered as a secondary priority in determining service area boundaries as most ecoregions do not match up with watershed boundaries.

1. Calumet-Dunes
2. St. Joseph River (Lake MI)
3. Maumee
4. Kankakee
5. Upper Wabash
6. Middle Wabash
7. Upper White
8. Whitewater-East Fork White
9. Lower White
10. Upper Ohio
11. Ohio-Wabash Lowlands

The IDNR will provide mitigation credits for aquatic resource loss within the service areas by completing projects in the same service area where the impact occurred. The types of impacts and priorities within each service area will guide IN SWMP project selection, plan development, and implementation.

Rationale

The IN SWMP seeks to establish an option for mitigation that is environmentally preferable to permittee responsible mitigation. This will be accomplished by consolidating mitigation projects and resources, providing financial planning and scientific resource expertise and reducing uncertainty over project success. To achieve these results the amount of fees collected by the IN SWMP must be sufficient to finance viable mitigation projects in each service area.

The State of Indiana is divided into 39 different 8-digit HUCs. The IDNR believes, based upon historical impact data, that proposing a service area for each 8-digit HUC would result in numerous small service areas that would not experience enough impacts and therefore collect enough fees from the sale of credits over a period of three years to finance the required mitigation projects that would adequately compensate for permitted impacts to aquatic resources.

IDNR believes that the eleven service areas proposed will result in effective compensation for adverse environmental impacts to aquatic resources within each service area. The service areas, except the St.

Joseph River and Upper White, are comprised of multiple 8-digit HUCs which IDNR biologists and ecologists believe have similar aquatic habitat systems and similar watershed characteristics.

The Calumet-Dunes Service Area includes two (2) 8-digit HUCs. This service area is defined by the geologic and natural features associated with Lake Michigan and its origins. This includes morainal forests and prairies, lake plain wetlands, sand savannas, sand prairies, dune and swale habitat, swamps, and the sand dune and beach topography of the lake border. Northern wetland types characterize the entire area, especially associated with the Little and Grand Calumet Rivers. Much of the southern portion of this service area is within the Central Corn Belt Plains with glaciated plains that were historically extensive prairie communities that have been replaced by agriculture. The eastern half of this service area is within the Southern Michigan/Northern Indiana Drift Plains with a wide assortment of landforms, soil types, soil textures and land uses. The eastern half of this service area also has low to medium gradient streams and is home to paleobeach ridges, relict dunes, and morainal hills.

This service area has a relatively dense concentration of impacts, but has limited opportunities for wetland and stream restoration in each HUC compared to the rest of the proposed service areas. The Chicago HUC has a significant amount of impacts, but urbanization has reduced the accessibility to quality restoration opportunities. The Little Calumet-Galien HUC has significantly less historical impacts, but provides for greater opportunity to restore and rehabilitate wetlands and streams.

The St. Joseph River Service Area is a single 8-digit HUC. This service area has a distinctly different watershed outlet (the eastern shore of Lake Michigan) from the other 8-digit HUCs in Indiana. Complex glacial topography of moraines, kettles, kames characterize the service area which contains many of the highest quality wetland areas in the state, including lakes, peat lands, bogs, swamps, wet prairies as well as rich upland forests and prairies. Due to the large size of this HUC, the distinct drainage outlet, and the largely congruous northern lakes region occurring there, this single 8-digit HUC will be a distinct service area.

The Maumee Service Area includes parts of four (4) 8-digit HUCs (State of Indiana portions). The 8-digit HUCs in this service area all drain to Lake Erie. This service area captures the entire drainage basin of the Maumee River in Indiana: clearly distinguished from all other Indiana drainages by a continental divide. The natural communities are similarly related by headwaters streams draining forested morainal areas surrounding the flat Maumee lake plain (the Black Swamp). The majority of this service area is a transitional area between the Loamy, High Lime Till Plains and the Maumee Lake Plains. Soils are less productive and more artificially drained in this portion of the Eastern Corn Belt Plains ecoregion compared to the western and southern portions of this ecoregion in Indiana. The Maumee Lake Plains ecoregion is poorly-drained and contains clayey lake deposits, water-worked glacial till, and fertile soils. Elm-ash swamp forests and beech forests once were extensive but have been replaced by productive, drained farmland.

Due to the small size and common outlet of the watersheds as well as the similarities of the ecology within this service area, the partial 8-digit HUCs were combined to form this service area. The watersheds included in this service area are all headwater watersheds for the Maumee River.

The Kankakee Service Area includes portions of two (2) 8-digit HUCs. The unifying feature of this service area is the Kankakee River. This vast area is bordered to the west by the prairie plains and

moraines of the Iroquois River, to the east, the northern wetlands and forested moraines of the Plymouth area. The two HUCs of this service area are mostly included in the Central Corn Belt Plains Ecoregion and both drain into the Illinois River. This ecoregion is characterized by the extensive flat, glaciated plains, wet prairies and bulrush-cattail marshes that were part of the sandy Kankakee drainage that has been converted to farms on the dark and fertile soils of this ecoregion. Additionally, these HUCs were combined to ensure sufficient credit sales within the service area. Individually, these HUCs individually have not had impacts such that they would support a financially viable service area on their own.

The Upper Wabash Service Area is a combination of seven (7) 8-digit HUCs. These HUCs are largely rural, experiencing population declines, have had relatively few historical impacts requiring mitigation, and are primarily headwater watersheds. While this is a relatively large geographic area, this service area is characterized throughout by the forested tributaries of the upper Wabash River and Tippecanoe River. These HUCs drain the plains and landscape features that have a Wisconsinan glaciation origin. This service area contains both the Eastern Corn Belt Plains and the Southern Michigan/Northern Indiana Drift Plains Ecoregions; the ecology of the HUCs is similar across the service area. Most of the latter ecoregion within this service area is the Middle Tippecanoe Plains, a Level IV ecoregion that is better to include from an ecological perspective with the other Upper Wabash watersheds of in this service area that are part of the Clayey, High Lime Till Plains that were also historically forested. Dividing this service area would create numerous smaller service areas that are not likely to be financially viable for the program when looking at the historical impact data.

The Middle Wabash Service Area includes all or part of six (6) 8-digit HUCs. This service area, while a relatively large geographic area, it is unified physiographically by the many distinct and highly incised and dendritic tributaries draining into the Central Wabash Valley. It was an area dominated by mixed deciduous forests. This includes streams of the central tillplain, as well as the Wabash lowlands and geologically older plains to the south. The Eel 8-digit HUC was included in the Middle Wabash Service Area due to fewer impacts within the remainder of the service area when compared to the relatively higher number of impacts in the Upper White Service Area and the Lower White Service Area. Also, the lower half of the Eel River watershed is within the Interior River Valleys and Hills ecoregion making it arguably more appropriate from an ecological perspective to be included in this service area rather than either the Upper White or the Lower White. Combining these HUCs into one service area should also ensure that it will remain financially viable for the program long-term.

The Upper White Service Area is defined as a single 8-digit HUC. This service area includes the city of Indianapolis and the surrounding suburbs which have a relatively high volume of impacts based on the Corps and IDEM data from 2006 to 2013. The service area is a relatively uniform region of forested streams and a poorly drained, formerly forested, level tillplain that has been converted to agriculture and more recently for urban sprawl.

The Whitewater-East Fork White Service Area includes all or parts of six (6) 8-digit HUCs. This service area includes 8-digit HUCs that are nearly entirely within the Eastern Corn Belt Plains Ecoregion. The area is characterized by the deeply incised Whitewater River valley to the east, and the flat, often poorly drained, headwaters of the East Fork White River, including the Muscatatuck River. It was an area of similar types of largely forested plant and animal communities, including many wetlands associated with stream corridors. The Whitewater River watershed was included in this service area with the East Fork

White as opposed to the Upper Ohio service area after taking into consideration the ecoregions of this portion of the state.

The Lower White Service Area is a combination of three (3) 8-digit HUCs. While large, and being comprised of two different ecoregions fairly equally, this service area is defined by the drainages of the lower stretches of both the East and West Forks of the White River to their confluence with the Wabash River. This includes the rugged topography and bedrock hills of unglaciated south-central Indiana. Large areas of karst plain topography are also present. Further west in the drainages, the land abruptly transitions to the broad level plains of the Wabash River lowlands. The entire service area was forested, with many affinities to southern woodland types. The rugged uplands possess very few wetland soil types outside of those directly associated with stream channels. However, the western lowlands, especially along the lower West Fork White and Patoka River, contain significant areas of hydric soils and existing wetlands. Individually, each of these 8-digit HUCs within this service area has not had historical impacts that required mitigation between 2006 and 2013 for each watershed to serve as an individual service area. Additionally, each of these three watersheds spans two ecoregions. Therefore, combining these three 8-digit HUCs into one service area creates what IDNR believes will be an ecologically and financially viable service area for the lifetime of the program.

The Upper Ohio Service Area includes three (3) 8-digit HUCs. These HUCs were combined into this service area since all three watersheds drain through fairly short basins into the Ohio River. While this service area is composed of two ecoregions, these HUCs share some ecologic similarities, primarily being composed of southern forests, including barrens and glades, on hilly to very rugged topography that was primarily unglaciated. Significant areas of karst topography are also present in much of this service area.
Additionally, the Corps and IDEM impact data show a small area of concentrated impacts with relatively few impacts in the remainder of the service area. Therefore, due to the ecological similarities and from studying the historical impact data, IDNR believes that combining these three HUCs into one service area will provide an ecologically and financially viable service area for the lifetime of the program.

The Ohio-Wabash Lowlands Service Area includes all or part of three (3) 8-digit HUCs. These HUCs drain into the Wabash and Ohio River and share many natural features. The extensive river bottom lowlands of this service area possess significant wetland resources. Many small streams drain the eastern hills region along short drainages directly into the Ohio River. The majority of this service area is within the Interior River Valleys and Hills ecoregion. While less than half of the Lower Ohio-Little Pigeon watershed is within the Interior Plateau ecoregion, it wasn't ecologically different enough to justify splitting this 8-digit HUC into two separate service areas. While the Corps and IDEM data show fairly evenly distributed impacts across the entire service area, the IDNR does not believe there will be a sufficient number of impacts in each individual 8-digit HUC in a three-year period for them to stand alone as individually as service areas and still remain ecologically and financially viable for the lifetime of the program.

ELEMENT 2. STATEWIDE AQUATIC RESOURCE THREATS

2.1 Streams and Rivers

According to the 2006 Indiana Comprehensive Wildlife Strategy, the primary threats to Indiana's streams and rivers included:

- Stream channelization
- Habitat degradation
- Non-point source pollution
- Habitat conversion
- Commercial/residential development
- Change in land use

Results from IDEM's comprehensive use support assessments are provided in the 2012 Integrated Water Monitoring and Assessment Report; this report indicated that approximately 72% (17,461) of the 24,232 stream miles assessed for aquatic life use were found to be fully supporting. Approximately 23% (4,785) of the 20,804 stream miles assessed supported full-body contact, recreational use. Almost all of Indiana's 67 miles of Lake Michigan shoreline outside of the Indiana Harbor were found to fully support aquatic life use, while almost all of the shoreline waters have been assessed as impaired for recreational and fishable uses.

Pathogens were the top cause of stream impairments, impacting more than 16,000 miles of streams. Polychlorinated biphenyl (PCB) in fish tissue impacted more than 4,175 miles, while mercury in fish tissue impacted nearly 2,100 miles of streams. More than 4,649 stream miles also had biological communities with measurable adverse response to pollutants. Potential sources impacting Indiana waters included nonpoint sources that impacted almost 11,700 miles of streams, while unknown sources impacted nearly 6,600 miles of streams (Indiana Integrated Water Monitoring and Assessment Report to the U.S. EPA: IDEM, 2012).

2.2 Wetlands

The leading threats to Indiana's wetlands include habitat degradation, habitat fragmentation, habitat conversion, commercial/residential development, and nonpoint source pollution. Major threats to wildlife in wetlands include habitat loss, and bioaccumulation of contaminants (Indiana Comprehensive Wildlife Strategy, 2006). National Wetlands Inventory (NWI) maps for Indiana were produced in the 1980's by the U.S. Fish and Wildlife Service, indicating wetlands by type; a more recent update of this data was conducted by Ducks Unlimited in 2005.

ELEMENT 3. HISTORIC AQUATIC RESOURCE LOSS/CURRENT CONDITIONS

Since the beginnings of European settlement, the state of Indiana has suffered both a quantitative and qualitative loss in these aquatic systems. During European settlement, Indiana's waterways provided food, power, and transportation for settlers; as a result of population growth and expansion, Indiana's aquatic systems continue to be impacted by deforestation, agricultural establishment, urban development, industrial effluent, storm water management, channelization, and encroachment. Additionally, increased levels of pollution were reaching Indiana's aquatic systems, causing a major decline in water quality (Amlaner & Jackson, 2012).

The IDNR analysis of the 1980-1987 NWI database concluded that wetland habitats in Indiana totaled approximately 813,032 acres (Indiana Wetland's Conservation Plan: IDNR, 1996). Conversely, there were approximately 5.6 million acres of wetlands during the 1780s, or 24.1% of Indiana's total land area; this change represents an 85.6% decline. During the early 1800s, Indiana was comprised of roughly 90% forest (20.4 million

acres) and 10% prairies (2 million acres), of which 25% were wetlands (5.6 million acres) (Amlaner & Jackson, 2012).

Approximately 54.8% of Indiana's land use is dominated by agriculture (Fry, et al., 2011), and a majority of wetlands were lost and continue to be lost due to drainage practices. Recent land use data indicates Indiana is composed mainly of agriculture, deciduous forest, pasture/hay, and developed, open land. Indiana has lost over 67% of its original forests since the years of pre-settlement. The most common wetland type within Indiana is freshwater forested/shrub (U. S. Fish and Wildlife Service, 2013). Wetlands of Indiana are being lost at a rate of approximately one to three percent each year, (Kim, Ritz, & Arvin, 2012).

For over 150 years, Indiana has been home to a vast network of surface and underground coal mines located in the southwest section of the state. In 2012, Indiana was the seventh greatest coal-producing state in the country and currently yields roughly 32-36 million tons of coal annually (Indiana Coal by the Numbers: IDNR). Prior to the passage of the Clean Water Act, wetlands and streams were dredged and filled as a result of coal mining because of their abundance of buried organic material. Acid mine drainage was and continues to be a concern for Indiana's wetlands and streams as acidic waters resulting from coal mining leached into the ground and downstream surface waters, degrading water quality and preventing the establishment and longevity of aquatic fauna and flora (Amlaner & Jackson, 2012). Abandoned mine reclamation has greatly improved this issue as restoration activities are ongoing to remedy these older, abandoned mines. Today, the Clean Water Act has rules and regulations regarding the discharge of fill or dredged material to Indiana's waters resulting from mining activities. Although these regulations focus on minimizing and avoiding aquatic resource impacts, mining continues to be a threat to Indiana's aquatic resources. Under the Surface Mining Control and Reclamation Act, coal mining industries are required to conduct studies to assess the impacts local waters would face as a result of coal mining activities as well as ensure that the discharge of pollutants caused by mining activities does not violate Clean Water Act standards (Clean Water Act, Section 402: U.S. EPA).

Impact data from 2006-2013 was obtained from IDEM and the USACE in order to determine the amount of wetlands and streams requiring mitigation in the state of Indiana. It is anticipated that new coal mining activities will not use IN SWMP and impacts from these permits are not included in the demand analysis. Coal mining companies may use IN SWMP to satisfy supplemental mitigation requirements. Wetland impacts larger than 20 acres and stream impacts larger than 10,000 linear feet were removed from the analysis to determine the amount of impacted streams and wetlands requiring mitigation (Table 1). The service areas with the greatest amounts of wetland acres requiring mitigation are the Upper White, Calumet-Dunes, and Lower White Service Areas. The service areas with the greatest amounts of stream linear feet requiring mitigation are Lower White, Upper White, and Middle Wabash Service Areas. Based on this data, IDNR believes that each service area and the program overall, will be economically viable.

Proposed Service Area (SA)	Mitigation Acres		Mitigation Linear Feet	
	IDEM	Corps	IDEM	Corps
Calumet-Dunes	164.102	91.303	11,219	1,491.21
Kankakee	34.133	39	15,626.87	2,115
St. Joseph River	29.734	12.837	7,707.59	2,570
Maumee	65.895	59.926	32,704	12,467
Upper Wabash	87.413	57.31	22,393	33,090
Middle Wabash	91.5096	76.081	28,741	51,156
Upper White	269.889	127.506	64,765.68	53,510.04
Whitewater-East Fork White	97.879	49.708	28,060	15,701.7
Lower White	144.246	147.616	91,767	132,467
Upper Ohio	57.06	49.708	27,723.336	19,358
Ohio-Wabash Lowlands	136.34	55.71	34,032.05	42,717

Table 1: Total impacted wetland acres and stream linear feet requiring mitigation from 2006 – 2013 based on impact data from IDEM and USACE

In order to determine the amount of potentially restorable land within the state of Indiana, hydric soils from the Soil Survey Geographic Database, existing wetlands from the NWI Database, and potentially restorable land cover types (e.g., crop, pasture) from the National Land Cover Database were mapped. Based on these maps, it was estimated that out of the 23,141,478 acres of Indiana's total land, 5,573,991 acres (24.1%) were hydric or partially hydric, of which 4,351,258 acres (78.1%) have the potential of being restored. Of these soils, approximately 16,856 acres (0.4%) have the potential to be restored on IDNR-owned land. This data analysis is a good starting point for locating potential sites; site specific data will be verified during the development of mitigation project sites.

The Upper Wabash, Middle Wabash, and Kankakee Service Areas contain the greatest amount of potentially restorable land; the Lower White, Kankakee, and Upper Wabash Service Areas contain the greatest amount of potentially restorable IDNR-owned land. Table 2 displays the total potentially restorable wetland acres within each service area and the potentially restorable linear stream miles located within 100 feet of agriculture within each service area. Only headwater streams were used in the analysis to determine the amount of potentially restorable streams.

Service Area Name	Potentially Restorable Wetland Acres	Potentially Restorable Linear Stream Feet
Calumet-Dunes	30,743	380,160
St. Joseph River (Lake MI)	225,842	1,219,680
Maumee	456,438	2,777,280
Kankakee	843,164	3,231,360
Upper Wabash	2,000,845	12,677,280
Middle Wabash	863,075	12,260,160
Upper White	678,635	4,123,680
Whitewater-East Fork White	838,906	11,816,640
Lower White	154,373	9,250,560
Upper Ohio	52,007	3,558,720
Ohio-Wabash Lowlands	132,588	7,671,840

Table 2: Total potential wetland and stream restoration numbers at a glance (values are estimations).

ELEMENT 4. PRIORITIZATION STRATEGY

4.1 Statewide Project Prioritization

IN SWMP projects in all service areas will effectively replace lost aquatic resource functions due to permitted physical impacts. The main goal of mitigation projects within each service area is to restore streams and wetlands as compensation for impacts to aquatic resources permitted through Section 401 and 404 of the Clean Water Act (CWA) and Indiana's Isolated Wetland Program.

Mitigation projects in all service areas will utilize a watershed approach to address the goals listed in watershed management plans within the service area in which the impact(s) occurred; this approach will have the greatest likelihood in being able to most effectively replace lost aquatic resource functions resulting from permitted impacts. In addition, the type of compensatory mitigation will relate to the type of impact which occurred. Specific regions with high amounts of restoration opportunities were identified by performing hotspot analyses on potentially restorable streams and wetlands. A hotspot is where potentially restorable wetlands or streams are clustered together, and their sum of acres or linear feet is significantly greater than the expected sum of acres or linear feet for that cluster's region. The expected sum of acres or linear feet for a specific region is based on the total potentially restorable wetland acres or stream linear feet across the entire service area. In each service area, the 10-digit HUC or 12-digit HUC watersheds; depending on the size of the service area, with the most hotspots will be identified and serve as the basis for mitigation priority areas. Not all mitigation projects will be sited within these priority areas.

Priority will be given to sites that have the greatest increase of ecological functions and services. These sites shall be further prioritized by the following activities in order: re-establishment, rehabilitation, establishment, enhancement, and preservation.

In situations where multiple sites have the equivalent ability to restore lost functions and services, priority for mitigation projects will be given to lands near existing, protected lands . Priority may also be given to sites that have little to no land acquisition costs, with a higher likelihood in the early years of the program.

For service areas containing an approved mitigation bank(s), priority will be given to projects that will restore wetland types which differ from those that can be supplied by the approved mitigation bank(s).

Projects to mitigate for stream impacts will be identified in part by coordinating with IDEM's Office of Water Quality (OWQ) Watershed Assessment and Planning Branch staff, when necessary, and consulting local watershed planning documents as well as the priority rankings for 303(d) listed waters which take into account the severity of the impairments for designated uses of the waters of Indiana. Mitigation projects in priority waters could address sources of impairments and, in turn, the priority water could be removed from the 303(d) list. Water quality data may be considered when selecting mitigation sites and focus will be given to aquatic systems suffering from water quality issues for which the mitigation project will be able to positively impact. Mitigation projects that can address water quality issues and promote watershed health will be given a higher priority in situations where multiple sites have the equivalent ability to restore lost functions and services.

The IDNR staff will make an effort to build partnerships and communicate with stakeholders to receive recommendations to manage, protect, and enhance at-risk ecological communities. Priority will be given to mitigation projects that serve the needs of multiple stakeholders.

4.2 General Criteria for Mitigation Site Identification and Selection

Numerous criteria are involved in the identification of mitigation sites including hydric soils and characteristics, topography, land use trends, ecological benefits, population/growth and development trends, wetland inventory data, protected lands, surrounding geography and landscapes, and physiographic regions.

The three steps below present the prioritization criteria for mitigation site identification and selection. This prioritization strategy will be used for project selection within each service area. In addition to this list, information from conservation partners, landowners and additional stakeholders may also be used during the site selection process as they may have knowledge or a pre-existing list of priority restoration lands. Ground investigations will be required to confirm or dismiss these datasets and determine the best locations for mitigation project sites.

When prioritizing sites for mitigation projects the following criteria shall be utilized:

First, all mitigation site proposals must contain the ability to result in a successful and sustainable net gain and/or preservation of aquatic resource functions and services and/or result in no net loss of Indiana's aquatic resources.

Consideration will be given to other criteria such as, but not limited to, cost, feasibility, size, proximity to other conservation lands or protected areas, connectivity or location in respect to corridors, human use value, and efficient long term maintenance.

Second, select mitigation projects based on their capacity to provide one or more aquatic resource functions and ability to achieve the goals and objectives as stated under this CPF on both the service area and HUC-8 watershed levels.

Third, select mitigation projects that are located within or adjacent to areas mapped as "hotspots" for potential restorable streams and/or wetlands or other priority conservation areas.

Each service area has specific priorities, detailed below, that will be incorporated into the above criteria when prioritizing projects.

Site selection will be based on conditions that favor the success of mitigation projects. Sites with conditions that hinder success of mitigation projects will not be selected for compensatory mitigation projects, as stated by Mitigation Rule p. 19674, §332.3 (c)(3)(i).

ELEMENT 5. PRESERVATION OBJECTIVES

According to the federal mitigation rule (33 CFR §332.3 (h)), preservation is defined as the removal of a threat to, or preventing the decline of, aquatic resources; this includes activities associated with the protection and maintenance of aquatic resources through the implementation of appropriate legal and physical mechanisms and does not result in a gain of aquatic resource area or functions.

Under the IN SWMP, preservation actions will be consistent with the watershed approach to protecting aquatic resources. The main objective of preservation mitigation projects is to permanently protect existing waters having a significant contribution to conservation needs within a service area.

Reference to Indiana's current CWS and SWAP should be made when identifying habitat threats and management goals; these plans will help determine where greatest preservation and conservation efforts are needed in the state. Consultation with local land trust organizations will be conducted to locate preservation opportunities. Preservation strategies will be based on their ability to relieve these threats and the importance of the resource to the watershed and/or State. Preservation will be used to provide compensatory mitigation when the following criteria are satisfied (33 CFR §332.3(f) (3) (h)):

1. The resources to be preserved provide important physical, chemical, or biological functions for the watershed;
2. The resources to be preserved contribute significantly to the ecological sustainability of the watershed;
3. Preservation is determined by the District Engineer in consultation with the IRT to be appropriate and practicable;
4. The resources are under threat of destruction or adverse modifications;
5. The preserved sites will be permanently protected though an appropriate legal instrument.

ELEMENT 6. PRIVATE AND PUBLIC STAKEHOLDER INVOLVEMENT

The IDNR will work diligently with private landowners, federal and state agencies, other conservation organizations, non-governmental organizations, academic institutions, local governments, watershed councils and associations, professional societies, universities, and public land agencies to meet the requirements of the Instrument. Individual mitigation projects will be implemented on private and public lands. The IDNR will work closely with volunteers and partners to deliver mitigation projects. Since the majority of land in Indiana is privately owned, there will need to be a cooperative effort between private land owners and public agencies.

Potential partners and stakeholders include:

Federal Agencies

- U.S. National Park Service
- U.S. Army Corps of Engineers
- U.S. Department of Agriculture (NRCS)
- U.S. Environmental Protection Agency
- U.S. Fish and Wildlife Service
- U.S. Forest Service
- U.S. Geological Survey
- U.S. Department of Transportation

State Agencies
- Indiana Department of Environmental Management
- Indiana Department of Natural Resources
- Indiana Department of Transportation

Other Organizations
- Conservation organizations (Local land trusts, Ducks Unlimited, and similar conservation organizations)
- Local municipalities
- Universities
- Private landowners

In addition to these agencies, IDNR will participate in public outreach activities to educate the public regarding the mitigation program and to seek local involvement in identifying mitigation projects. The public will also have an opportunity to comment on IN SWMP projects during the public comment period laid out in 33 CFR §332.8(d) 4 when mitigation plans are submitted to the District Engineer; participation by the public in this process will be greatly encouraged by the IDNR during each public comment period.

Partners will be able to not only provide knowledge of the local area, but they will also be able to help locate and identify areas for mitigation projects, assist with the development and implementation of monitoring programs, provide long-term management, potentially provide protection to mitigation sites after implementation, and provide additional key contacts.

ELEMENT 7. LONG-TERM PROTECTION AND MANAGEMENT

IDNR shall be responsible for developing and implementing a long-term protection and management plan for each IN SWMP project. IDNR may utilize existing publicly owned property or secure property for inclusion to the public trust. Projects implemented on publicly owned property or property that will be transferred to public ownership shall be protected and managed through facility management plans, integrated natural resource management plans, or deed restrictions as necessary. IDNR may also utilize privately-owned properties and will record real estate instruments to guarantee protection of privately-owned properties. Long term management of privately-owned properties will be transferred to an appropriate natural resource management entity with a plan approved by the District Engineer in consultation with the IRT.

The IN SWMP projects will be designed, to the maximum extent practicable, to require minimal long-term management efforts once performance standards have been achieved. IDNR shall be responsible for maintaining IN SWMP program projects consistent with the mitigation plan to ensure long-term viability as functional aquatic resources. IDNR shall retain responsibility unless and until the long-term management responsibility is formally transferred to a long-term manager with Corps approval. The long-term management plan developed for each IN SWMP project will include a description of anticipated management needs with annual cost estimates and an identified funding mechanism (such as non-wasting endowments, trusts, contractual arrangements with future responsible parties, or other appropriate financial instruments). Other voluntary management activities may be considered as long as no detrimental effects to the mitigation project are realized. Reference to 33 CFR §332.7 (d) shall be made when determining the long-term management plan for each mitigation project.

The final mechanism for long-term protection and management shall be submitted to the IRT for review, and approval will be made by the District Engineer in consultation with the IRT prior to the release of mitigation project credits.

ELEMENT 8. PERIODIC EVALUATION STRATEGY

Every 5 years, the IDNR will submit a program findings/evaluation report to the District Engineer and the IRT as a supplement to the Annual Program Report; this report will address how the goals and objectives set forth in the Instrument are being met in terms of site selection and project implementation.

The report may also include any proposed changes to the Compensation Planning Framework. A review of the resources used to create the Compensation Planning Framework will be conducted during the evaluation. Requested changes to the Compensation Planning Framework will be submitted as an amendment to the Instrument for approval by the District Engineer in consultation with the IRT.

ELEMENT 9. RESOURCE GOALS AND OBJECTIVES

The goals and objectives of the IN SWMP mitigation projects are to:

1. Provide compensatory mitigation to satisfy IDNR's responsibilities taken on by the sale or transfer of mitigation credits to fulfill Corps and/or IDEM permit requirements.

2. Establish mitigation projects in areas within each service area that have experienced high losses of wetland and stream functions and services.

3. Replace historic wetland and stream types that were present in those areas, while recognizing current hydrological and geomorphological conditions that are present.

4. Contribute to goals of the Indiana State Wildlife Action Plan for species of concern that depend upon stream and wetland habitats.

5. Address sources of impairment for 303(d) listed aquatic resources as feasible.

6. Provide buffers around mitigation projects to protect the ability of the site to provide ecological functions and services.

7. Preserve rare and high quality aquatic resources; critical habitat for rare and endangered species; priority habitat for species of greatest conservation concern; or other areas meeting the requirements of 33 CFR §332.3(f)(3)(h).

8. Restore, enhance, establish and/or preserve wetland and stream resources though initiating projects within 3 growing seasons after selling the first advance credit in each Service Area that provide the number of credits shown in Table 3. This is dependent upon the total amount of credits sold and the available funding.

Service Area	Stream Credits	Wetland Credits
Calumet-Dunes	500	25
St. Joseph River (Lake MI)	750	5
Maumee	3,000	15
Kankakee	500	10
Upper Wabash	5,250	15
Middle Wabash	6,500	20
Upper White	12,250	30
Whitewater-East Fork White	3,750	15
Lower White	20,750	35
Upper Ohio	4,500	15
Ohio-Wabash Lowlands	7,750	15

Table 3 – Initial Project Initiation Goal based upon the assumption that the program will absorb 60% of the anticipated required mitigation in each service area.

In order to meet the service area goals, available data and information contained in the most current versions of the following Indiana plans will be utilized:

1. Regional Watershed Management or restoration plans and data
2. Local Watershed Management plans or initiatives
3. IDNR Lake and River Enhancement (LARE) Program information and data
4. IDEM's 303(d) list and 305(b) reports
5. Indiana State Wildlife Action Plan (SWAP)
6. Indiana Comprehensive Wildlife Strategy (CWS) Indiana Natural Heritage Database
7. U.S. Fish & Wildlife Service plans, reports, or studies
8. U.S. Department of Agriculture (USDA) programs
9. U.S. Geological Survey (USGS) studies and data
10. IDEM Wetland Program Plan
11. Other public sources of information

The following sections provide additional Service Area specific information, details on the status of the aquatic resources, and the specific compensatory mitigation approach and priorities.

9.1 CALUMET-DUNES SERVICE AREA

A. Service Area Description

The Calumet-Dunes Service Area is located in the most northwestern portion of Indiana and borders Lake Michigan. It includes all or portions of the following 8-digit HUCs:

- **04040001 – Little Calumet-Galien**
- **07120003 - Chicago**

The Calumet-Dunes Service Area includes portions of the four Indiana counties listed below in the Lake and Northern Moraine physiographic region. A fraction of Lake, Porter, and LaPorte Counties are also split with the Kankakee Service Area.

Lake	LaPorte	St. Joseph
Porter		

The Calumet-Dunes Service Area is located in two ecoregions; the western portion is located in the Central Corn Belt Plains; the eastern portion is located in the Northern Indiana Drift Plains. The western portion of the service area is characterized by its beach ridges, marshy swales, and sand dunes; the eastern portion of the service area contains higher dunes, greater woodlands, lower relief, and less urban-industrial activity than the western portion of the service area. In addition, the eastern portion is characterized by its sandy coastal strip with beaches, beach ridges, and swales (Ecoregions of Indiana: U.S. EPA).

The Little Calumet-Galien Watershed (HUC-04040001) within Indiana drains approximately 512 square miles (327,680 acres) into Lake Michigan (Northwestern Indiana Regional Planning Commission), while the Chicago Watershed (HUC-07120003) drains 90 square miles (57,600 acres) into the Illinois River; in total, the Calumet-Dunes Service Area spans approximately 602 square miles, or 385,280 acres.

The Calumet-Dunes Service Area is currently dominated by developed, low intensity land use, cultivated crops (agriculture), and deciduous forest; woody wetlands are also prominent in this area.

B. Resource Status (historic impacts, current conditions, and threats)

In addition to the previous discussion of historical impacts in Indiana waters, a report from the IDNR has provided information from the mid-1900s on the status and impacts to aquatic ecosystems near the shore of Lake Michigan as well as stream resources in the Calumet-Dunes area (IDNR Division of Water, 1994). This report noted sources of impacts which affected recreational uses of rivers included oil, grease, floating debris, and odors; sources of impacts which made these waters unfit for body contact included high coliform bacteria counts. Beaches on Lake Michigan were often closed due to high bacteria counts, and water purification facilities reported excessive ammonia concentrations near intake cribs and taste and odor problems. The causes of these impacts resulted from urban sewage disposal, channel dredging, and effluent from oil refineries and steel mills (IDNR Natural Resources Commission, 1996). Additional impacts reported were related to industrial development and urbanization.

Prior to 1900, the Grand and Little Calumet Rivers of Indiana drained into Lake Michigan and deposited sewage and other contaminants directly into the lake. The Grand Calumet River (GCR) has been significantly altered since the early 1900s from hydromodification activities including channelization, dredging, and damming; primary impacts to the river included habitat loss and degradation due to these alterations as well as residential and industrial development. Remediation and restoration efforts in the GCR Area of Concern (AOC) over the last decade and over the next several years has resulted in the USEPA targeting the GCR as a candidate for being delisted as an AOC in the Great Lakes as early as 2020.

The Little Calumet River has also suffered similar impacts from industrial pollution and residential establishment which have reduced the river's ecological services provided to its watershed. Hydromodifications to the Little Calumet River changed flow characteristics of the river which affected the life stages of aquatic organisms and reduced the suitability of stream habitat for fish and wildlife (Little Calumet River WMP).

More recently, IDEM reported E. coli, impaired biotic communities, and nutrients as the leading causes of stream impairments within the service area (Indiana Integrated Water Monitoring and Assessment Report to the U.S. EPA: IDEM, 2012).

The Calumet-Dunes Service Area contains rare dune and swale ecosystems which provide important habitat for wildlife and is characterized by upland dune ridges and low-relief wetlands. Prior to settlement, dune and swale ecosystems covered an area of roughly 10,000 acres; today, only 1,000 acres remain as a result of habitat alteration and contamination by various sources (USFWS, 2001).

Wetland acreage within the Calumet-Dunes Service Area totals approximately 42,671 acres, or 11.1% land cover of the service area; the most prominent wetland type within the service area is freshwater forested/shrub wetland, totaling 24,272 acres, or 4.0% total land cover; wetlands have been lost due to habitat alterations.

Impact data from 2006-2013 in the Calumet Dunes Service Area were collected from the USACE and IDEM and analyzed. During this recent time period, 91 acres of impacted wetlands and 1,491 linear feet of impacted streams required mitigation according to data from the USACE and 164 acres of impacted wetlands and 11,219 linear feet of impacted streams required mitigation according to data from IDEM.

C. Compensatory Mitigation Approach & Priorities

Urbanization and industrialization are common causes of aquatic resource impairments in the Calumet-Dunes Service Area. Mitigation projects will improve channel structure and reduce sedimentation that has resulted from

stream bank erosion and channel alteration. The expansion of rehabilitation and enhancement on the Grand Calumet River could be a potential source for mitigation projects within the service area.

Additional sources of projects that could be investigated will be located in the rare dune and swale habitats along the Lake Michigan Shoreline. These habitats are home to various fauna and flora communities; however, impacts resulting from industrialization and urbanization have caused habitat loss and have impacted aquatic fauna and flora. Mitigation projects will aim at potentially re-establishing, rehabilitating, enhancing and preserving these rare habitat types. Projects which increase the functions and services of globally rare dune and swale habitats will be a priority in this service area; a supplemental goal will be the preservation of dune and swale topography.

Currently, the following land trusts exist within the service area: the Shirley Heinze Land Trust, Inc. and the Woodland Savanna Land Conservancy. There is the potential for land trusts to dissolve, adjust their geographical boundaries, and for new land trust organizations to be created within the service area. IDNR will work with the land trusts that exist in the service area over the life of the program

Currently, the following watershed plans exist within the service area: Deep River-Turkey Creek WMP, NIRPC WMP, Dunes Creek WMP, Galena River WMP, Little Calumet WMP, Salt Creek WMP, and Trail Creek WMP. However, IDNR will utilize the most current watershed planning information that is available as these plans are updated and/or new watershed plans are developed within this service area over the life of the program.

Hydric and partially hydric soils account for 105,087 acres, or 27.3% land cover, within the service area, out of which 30,743 acres have the potential to be restored. This was determined by mapping current hydric and partially hydric soils data with potentially restorable land cover types (e.g., cropland, pasture) located in the service area. Hotspots account for 14,905 acres of these potentially restorable wetlands within the service area. The watershed with the most hotspots of potentially restorable wetlands is Kemper Ditch-East Arm Little Calumet River (HUC 040400010403 [Table 4]). Approximately 380,160 linear feet of stream are located within 100 feet of agricultural fields; these linear miles of stream could provide opportunities for re-habilitation. Hotspots account for 120,766 linear feet of potentially restorable streams within the service area. The watershed with the most hotspots of potentially restorable streams is Duck Creek (HUC 040400010508 [Table 5]). The watersheds with the most hotspots (Tables 4 & 5) serve as the basis for priority areas. There are 367 acres of potentially restorable wetlands on IDNR-owned lands within the service area. There are 1,986 acres of hotspots of potentially restorable wetlands adjacent to IDNR-owned lands within the service area. Reynolds Creek Gamebird Habitat Area is the IDNR-managed land with the most adjacent hotspots of potentially restorable wetlands (1,160 acres). The only other IDNR-managed lands adjacent to hotspots of potentially restorable wetlands are Beaver Dam Wetland Conservation Area (687 acres) and Calumet Prairie (139 acres). This program will focus on re-establishing and/or rehabilitating 25 acres of forested wetland and 500 linear feet of perennial headwater streams within the priority areas of this service area. These goals are assuming the program will absorb 60% of the anticipated required mitigation within the first three years of the program.

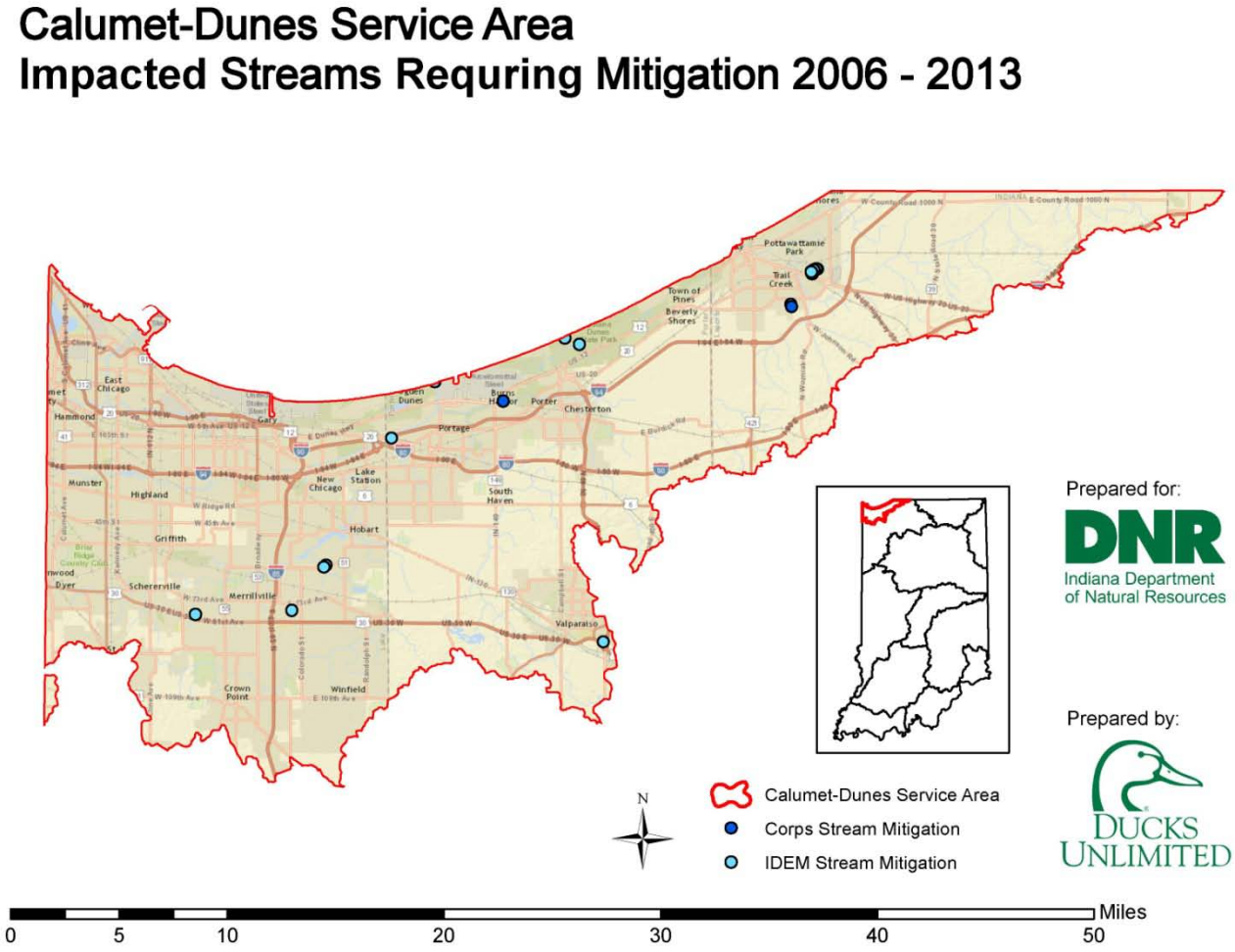


Figure 1. Impacted Streams Requiring Mitigation in the Calumet-Dunes Service Area (2006-2013)

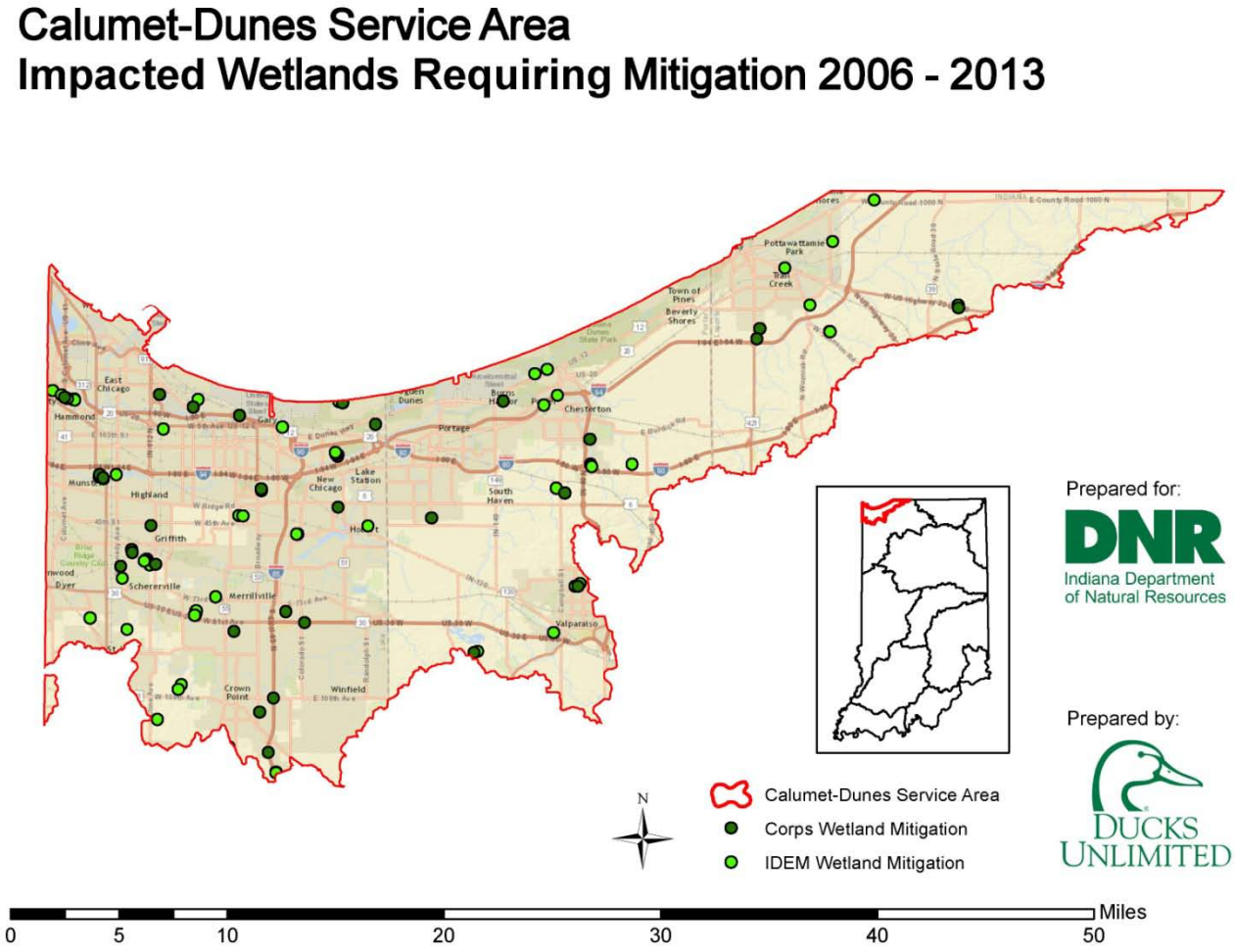


Figure 2. Impacted Wetlands Requiring Mitigation in the Calumet-Dunes Service Area (2006-2013)

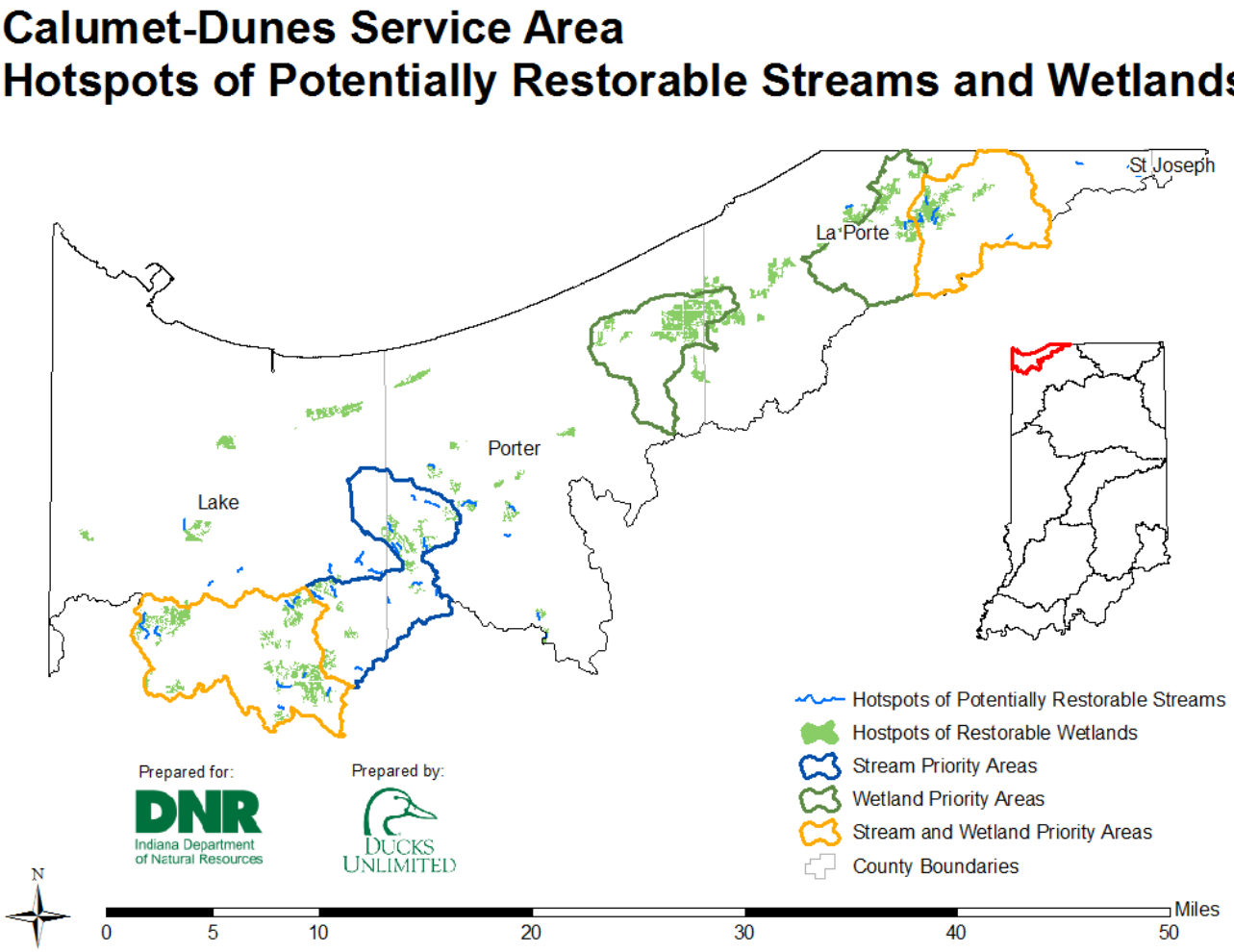


Figure 3. Hotspots of Potentially Restorable Streams and Wetlands in the Calumet-Dunes Service Area

HUC 12 Code	HUC 12 Name	Hotspots of Potentially Restorable Wetlands (acres)
040400010403	Kemper Ditch-East Arm Little Calumet River	2,466
040400010504	Main Beaver Dam Ditch-Deep River	2,003
040400010206	Headwaters South Branch Galien River	1,448
040400010105	East Branch Trail Creek	1,329
040400010502	Headwaters Main Beaver Dam Ditch	1,192

Table 4: Watersheds in the Calumet-Dunes Service Area with the most hotspots of potentially restorable wetlands

HUC 12 Code	HUC 12 Name	Hotspots of Potentially Restorable Streams (linear feet)
040400010508	Duck Creek	22,328
040400010507	Deer Creek-Deep River	22,208
040400010504	Main Beaver Dam Ditch-Deep River	20,458
040400010206	Headwaters South Branch Galien River	20,028
040400010502	Headwaters Main Beaver Dam Ditch	19,083

Table 5: Watersheds in the Calumet-Dunes Service Area with the most hotspots of potentially restorable streams

9.2 ST. JOSEPH RIVER (LAKE MICHIGAN) SERVICE AREA

A. Service Area Description

The St. Joseph River Service Area is located in northeastern Indiana. It includes the following 8-digit HUC watershed:

- **04050001 - St. Joseph River**

The St. Joseph River Service Area includes all or portions of the seven Indiana counties listed below in the Northern Moraine and Lake Region physiographic region.

St. Joseph	Kosciusko	LaGrange	Steuben
Elkhart	Noble	DeKalb	

The St. Joseph River drains to Lake Michigan at St. Joseph, MI. Approximately 42 miles of the 210 mile long St. Joseph River reside within two counties of Indiana, Elkhart and St. Joseph; a majority of the river travels through farmland (Our Watershed: Friends of the St. Joe River Association, Inc., 2013). Major tributaries discharging to the St. Joseph River within Indiana include Fawn River, Elkhart River, and Little Elkhart River.

Approximately 1,685 square miles of the 4,685 square mile St. Joseph Watershed is located in northeastern Indiana; the remainder is located in southwestern Michigan. The St. Joseph River Service Area is located in the Northern Indiana Drift Plains and is characterized by pothole lakes, ponds, marshes, and bogs; land cover is dominated by corn, soybean, wheat, and livestock farming (Ecoregions of Indiana: U.S. EPA). Currently, the St. Joseph River Service Area is dominated by a mix of agriculture, pasture/hay, and woody wetlands.

B. Resource Status (*historic impacts, current conditions, and threats)*

Prior to European settlement over 200 years ago, the St. Joseph River Service Area was covered by deciduous forests, and the landscape was home to a diversity of fish and wildlife species. In addition to the previously discussed historical impacts in Indiana waters, the St. Joseph River Watershed Management Plan identified sediment, habitat and natural systems losses, and hydrological modifications as impairments to water resources of the service area. Sources of sedimentation included cropland, construction sites, and eroding banks with causes being construction sites, road/stream crossings, and lack of riparian buffer strips. Habitat and natural systems loss resulted from land use alterations and the spread of invasive species, and hydrological alterations were caused by stream channelization, the removal of vegetation from stream banks, and urban development (DeGraves, 2006).

More recently, IDEM reported that the leading causes of impairment to the streams of the St. Joseph River Service Area were E. coli, impaired biotic communities, and nutrients. Additional causes included chloride,

PCBs and mercury in fish tissue, and ammonia (Indiana Integrated Water Monitoring and Assessment Report to the U.S. EPA: IDEM, 2012).

Shorelines of the natural lakes within the St. Joseph River Service Area have been altered by humans throughout history, resulting in the loss of important lacustrine wetland areas. These alterations were caused by a variety of activities such as road construction and residential development. As a result of these alterations, natural areas have been fragmented and biodiversity has been significantly reduced. This decrease in diversity and productivity has ultimately caused a decrease in the health of aquatic ecosystems existing within lacustrine wetlands; human activities have proven to be primarily responsible for the degradation of plant communities, wildlife habitat, and water quality of these wetlands (Price, 2009).

Wetlands were once prominent in the area but were altered as the population increased; most recent NWI data shows that approximately 10% of the land cover in the St. Joseph Watershed is wetlands which are home to many migratory birds and the federally-endangered Indiana Bat (DeGraves, 2006). The St. Joseph River Service Area contains four Indiana counties containing the greatest densities of wetlands within the entire state; these counties are LaGrange, Steuben, Noble, and Kosciusko (The Status of Wetlands in Indiana: IDNR, 1996). Total wetland acreage within the St. Joseph River Service Area is approximately 108,390 acres; the most prominent wetland type within the service area is freshwater forested/shrub wetland totaling 51,622 acres, or 4.7% total land cover.

Impact data from 2006-2013 in the St. Joseph River Service Area were collected from the USACE and IDEM and analyzed. During this recent time period, 12 acres of impacted wetlands and 2,570 linear feet of impacted streams required mitigation according to the data from the USACE and 29 acres of impacted wetlands and 7,707 linear feet of stream required mitigation according to the data from IDEM.

C. Compensatory Mitigation Approach & Priorities

Habitat conversion, due to agriculture and urbanization, is a common cause of aquatic resource impairments in the St. Joseph River Service Area. Re-establishment and rehabilitation of wetlands and streams that are important to freshwater lake water quality will be a primary priority within this service area, and will focus on returning agricultural land to forested or scrub-shrub wetlands. A secondary priority of preservation is the protection of existing habitats that will ensure the quality of downstream lakes, as well as the preservation of bogs.

Coordination with the St. Joseph River Basin Commission (SJRBC) for mitigation projects within the St. Joseph River Service Area will also be pursued. The SJRBC has completed the following watershed plans in the service area: Baugo Creek-Wisler Ditch, Elkhart River, Hesston-Stock Ditch Headwaters (including Pleasant and Riddles Lakes), Juday Creek, Little Elkhart River, Pigeon Creek, and Pigeon River.

Currently, the following land trusts exist within the service area: Trillium Land Conservancy, Wood-Land-Lakes RC&D Council, Clear Lakes Township Land Conservancy, Blue Heron Ministries, Wawassee Area Conservation Fund, and ACRES Land Trust. There is the potential for land trusts to dissolve, adjust their geographical boundaries, and for new land trust organizations to be created within the service area. IDNR will work with the land trusts that exist in the service area over the life of the program

Currently, the following watershed plans exist within the service area: Baugo Creek WMP, St. Joseph River (MI) WMP, Elkhart River WMP, Elkhart River-Yellow Creek (lower) WMP, Five Lakes Area WMP, Little Elkhart River WMP, Pigeon Creek WMP, and Puterbaugh Creek-Heaton Lake WMP. However, IDNR will utilize the most current watershed planning information that is available as these plans are updated and/or new watershed plans are developed within this service area over the life of the program.

Hydric and partially hydric soils account for 362,532 acres, or 33.3% land cover, within the service area, out of which 225,842 acres have the potential to be restored. This was determined by mapping current hydric and

partially hydric soils data with potentially restorable land cover types (e.g., cropland, pasture) within the service area. Hotspots account for 109,756 acres of these potentially restorable wetlands within the service area. The watershed with the most hotspots of potentially restorable wetlands is Wisler Ditch-Baugo Creek (HUC 040500012102 [Table 6]). Obtaining a rough estimate of potential restoration sites for permitted stream impacts, approximately 1,219,680 linear feet of streams in the St. Joseph River Service Area are located within 100 feet of agricultural fields; these linear miles of stream could provide opportunities for re-habilitation. Hotspots account for 467,444 linear feet of these potentially restorable streams within the service area. The watershed with the most hotspots of potentially restorable streams is Village Lake-Turkey Creek (HUC 040500011701 [Table 7]). The watersheds with the most hotspots (Tables 6 & 7) serve as the basis for the priority areas. This program will focus on re-establishing and/or rehabilitating 5 acres of forested and/or scrub shrub wetland and 750 linear feet of perennial headwater streams within the priority areas of this service area. These goals are assuming the program will absorb 60% of the anticipated required mitigation within the first three years of the program.

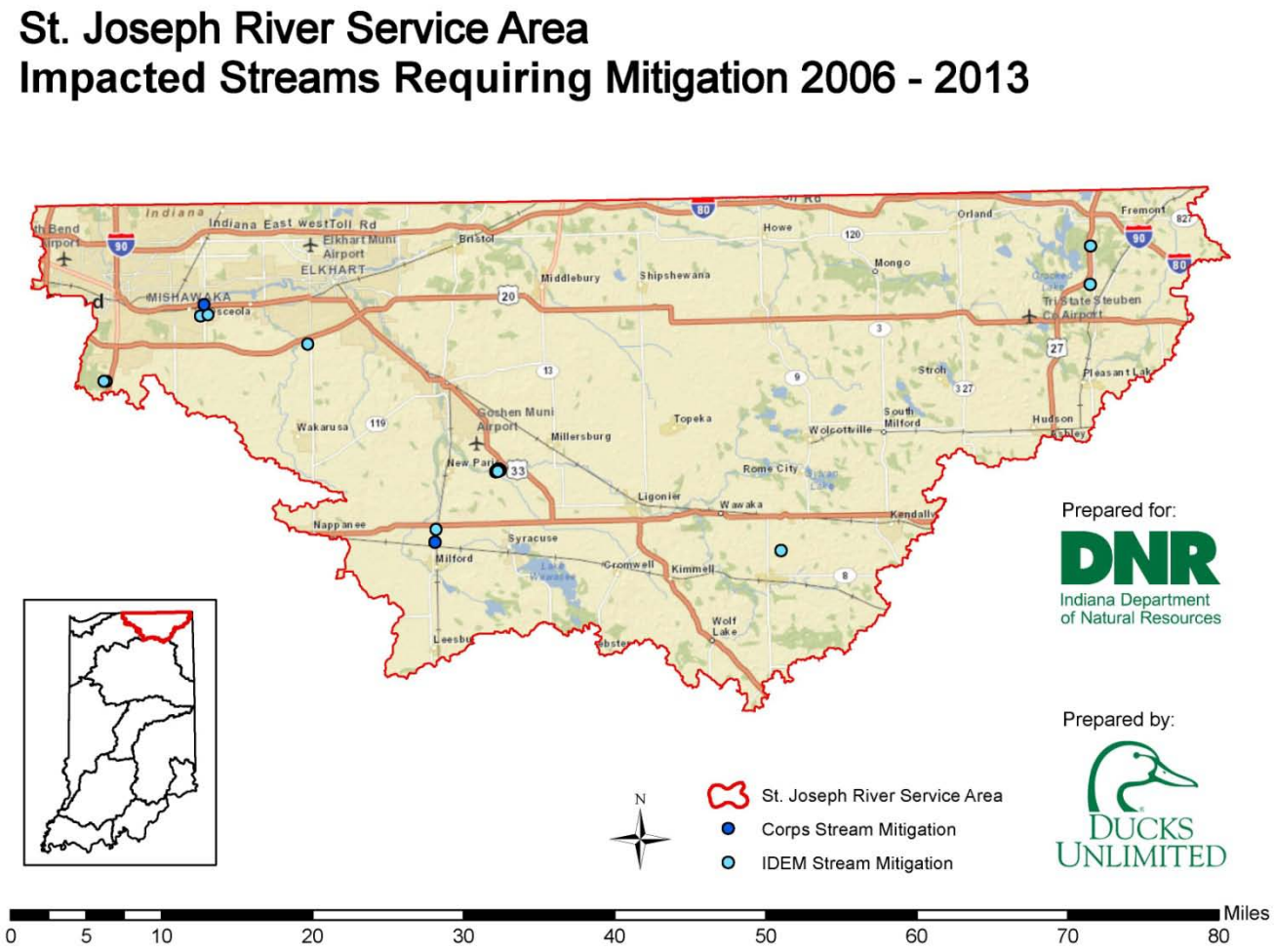


Figure 4. Impacted Streams Requiring Mitigation in the Calumet-Dunes Service Area (2006-2013)

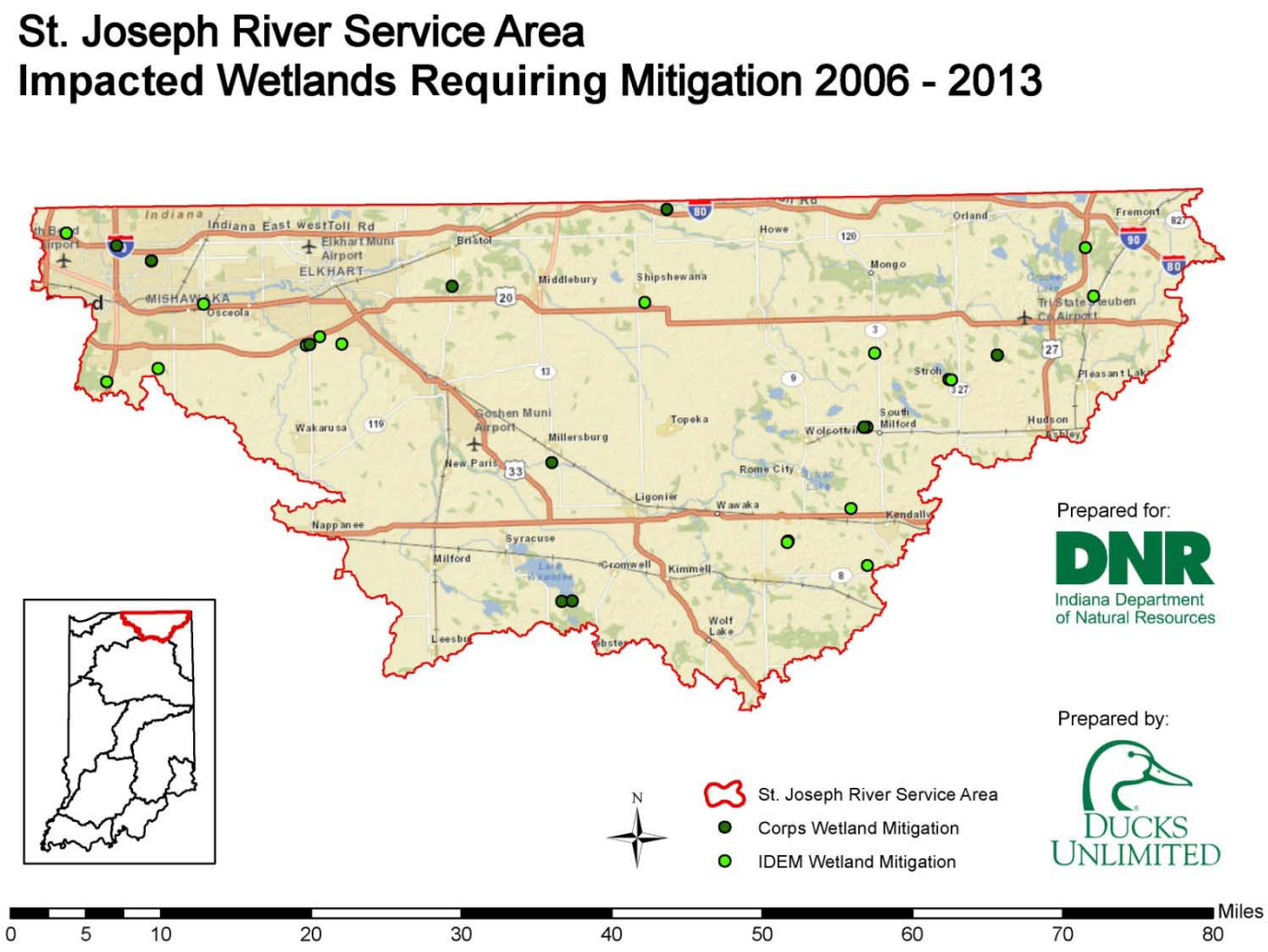


Figure 5. Impacted Wetlands Requiring Mitigation in the Calumet-Dunes Service Area (2006-2013)

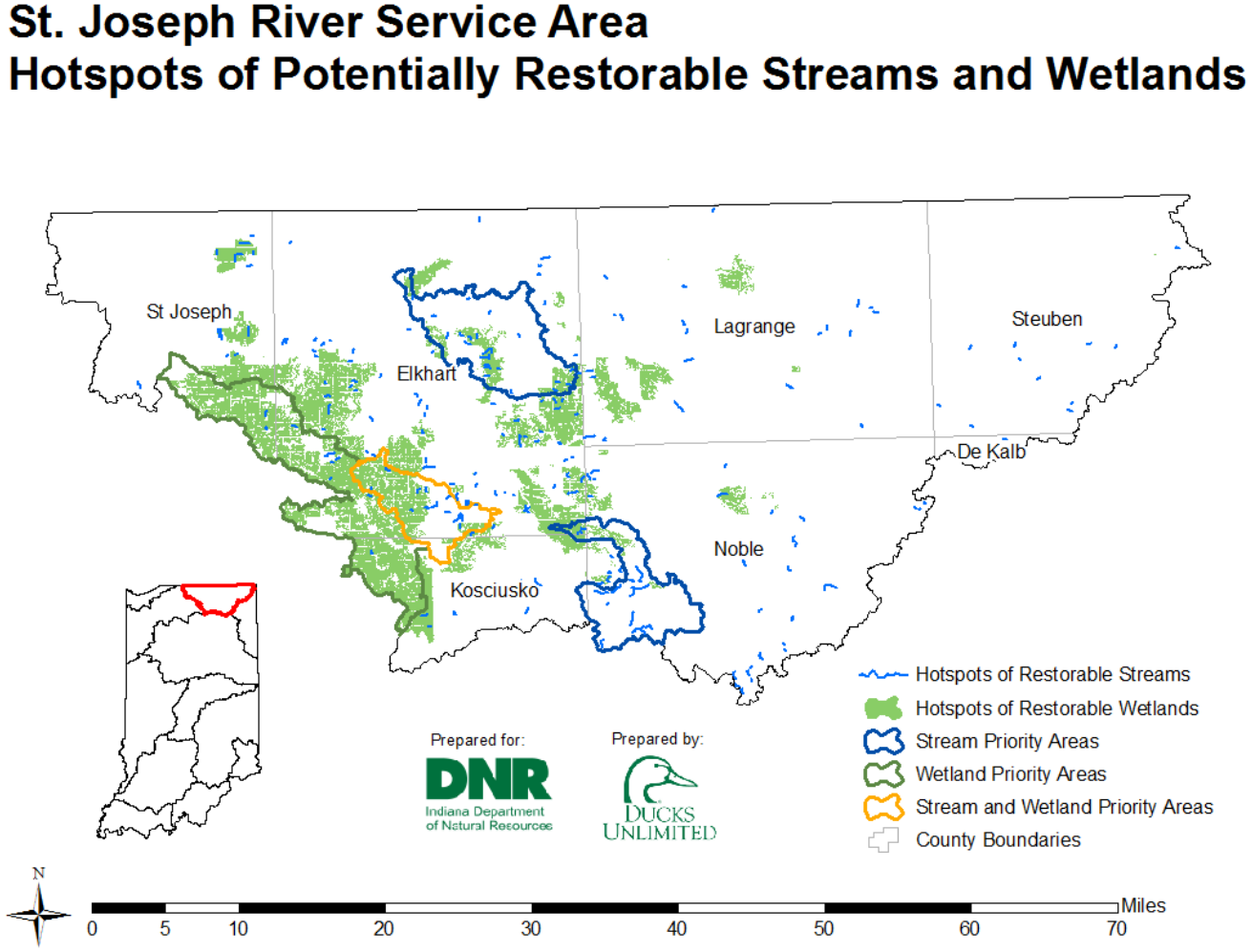


Figure 6. Hotspots of Potentially Restorable Streams and Wetlands in the St. Joseph River Service Area

HUC 12 Code	HUC 12 Name	Hotspots of Potentially Restorable Wetlands (acres)
040500012102	Wisler Ditch-Baugo Creek	10,585
040500011707	Omar Neff Ditch-Turkey Creek	9,815
040500011708	Dausman Ditch-Turkey Creek	8,555
040500012101	Grimes Ditch	8,216
040500011706	Berlin Court Ditch	7,353

Table 6: Watersheds in the St. Joseph River (Lake Michigan) Service Area with the most hotspots of potentially restorable wetlands

HUC 12 Code	HUC 12 Name	Hotspots of Potentially Restorable Streams (linear feet)
040500011701	Village Lake-Turkey Creek	32,216
040500011708	Dausman Ditch-Turkey Creek	29,434
040500011901	Hoover Ditch-Rock Run Creek	24,699
040500011803	Headwaters Solomon Creek	24,273
040500011709	Pine Creek	18,295

Table 7: Watersheds in the St. Joseph River (Lake Michigan) Service Area with the most hotspots of potentially restorable streams

9.3 MAUMEE SERVICE AREA

A. Service Area Description

The Maumee Service Area is located in northeastern Indiana and is composed of the following four 8-digit HUCs:

- **04100003 - St. Joseph**
- **04100005 - Upper Maumee**
- **04100007 - Auglaize**
- **04100004 - St. Marys**

The Maumee Service Area includes portions of the six Indiana counties listed below in the Maumee Lake Plain Region as well as the Northern Moraine and Lake Region physiographic regions. The Maumee Lake Plain Region is contained within Allen County only.

Steuben	Noble	Wells
DeKalb	Allen	Adams

Major rivers and streams of the Maumee Service Area include the St. Marys, St. Joseph, and Maumee Rivers. The St. Marys River begins in northwestern Ohio where it flows north to Fort Wayne, Indiana and converges with the St. Joseph River to form the Maumee River; the Maumee River flows 150 miles northeast where it drains to Lake Erie.

Draining approximately 821,671 acres of northeastern Indiana, the Maumee Service Area is mainly located within the Eastern Corn Belt Plains ecoregion and is characterized by rolling till plains where original beech forests and scattered elm-ash swamp forests have been replaced by farming; soils in this ecoregion are good for cropland. A smaller section of the service area located within Allen County is part of the Huron/Erie Lake Plains ecoregion, more specifically the Maumee Lake Plains sub-region, and is characterized by broad plains interspersed by sand dunes, end moraines, and beach ridges; the Maumee Lake Plains are poorly-drained and contain fertile soil. Elm-ash and beech forests have been replaced by drained farmland, and agricultural activities as well as ditching have greatly degraded the habitats and water quality of the Upper Maumee's aquatic systems (Ecoregions of Indiana: U.S. EPA).

The Maumee Service Area is dominated by agriculture, deciduous forest, and developed, open land. Woody wetlands and emergent, herbaceous wetlands make up approximately 2.8% of the Maumee Service Area (Fry, et al., 2011).

B. Resource Status (*historic impacts, current conditions, and threats*)

Prior to European settlement, portions of the Upper Maumee Watershed (HUC-04100005) and Auglaize Watershed (HUC-04100007) were positioned within the region of the Great Black Swamp which was a combination of marshland and forested swamps covering over 9,000 acres. By the beginning of the twentieth century, less than 4% of the Great Black Swamp remained due to drainage practices (Mitsch & Gosselink, 2007). Agriculture is the predominant land use in the Great Black Swamp area today.

In addition to the previously discussed historical impacts in Indiana waters, a report from the mid-1990s by the St. Joseph River Watershed Initiative recognized sedimentation, pesticides, pathogens, and nutrients as target water quality issues within the St. Joseph River Watershed (HUC-04100003) (St. Joseph River Watershed Initiative: U.S. EPA, 1996). Causes of impairments to the remaining watersheds within the service area included impaired biotic communities caused by ammonia, nutrients, and E. coli. More recently, IDEM reported that the leading causes of impairment to the streams of the Maumee Service Area were E. coli, impaired biotic communities, and nutrients. Additional causes included PCBs and mercury in fish tissue (Indiana Integrated Water Monitoring and Assessment Report to the U.S. EPA: IDEM, 2012).

Total wetland acreage within the Maumee Service Area is approximately 35,144 acres, or 4.3% land cover of the service area; the most prominent wetland type within the service area is freshwater forested/shrub wetland, totaling 17,099 acres, or 2.1% total land cover within the service area.

Impact data from 2006-2013 in the Maumee Service Area were collected from the USACE and IDEM and analyzed. During this recent time period, 60 acres of impacted wetlands and, 12,467 linear feet of impacted streams required mitigation according to the data from the USACE and 66 acres of impacted wetlands and 32,704 linear feet of stream required mitigation according to the data from IDEM.

C. Compensatory Mitigation Approach & Priorities

Habitat conversion is the primary cause of aquatic resource impairments in the Maumee Service Area. This results in negative impacts to aquatic fauna and flora as well as water quality degradation. Mitigation projects in the Maumee Service Area will focus on re-establishing historic wetland complexes, and a priority for this service area will be forested and scrub-shrub wetlands and streams near and adjacent to the Great Black Swamp that reduce nutrient loading. Stream projects will be focused on reducing nutrient loading by reconnecting the stream to the floodplain and establishing a riparian buffer.

Coordination with the Maumee River Basin Commission (MRBC) for projects within the Maumee Service Area will also be pursued. Currently, the MRBC has a voluntary agricultural land-use conversion program that includes wetland restoration. Coordination with this program and their local landowner contacts could provide added value in this service area.

Currently, the following land trusts exist within the service area: Wood-Land-Lakes RC&D Council, Blue Heron Ministries, Steuben County Lakes Council Land Trust, and ACRES Land Trust. There is the potential for land trusts to dissolve, adjust their geographical boundaries, and for new land trust organizations to be created within the service area. IDNR will work with the land trusts that exist in the service area over the life of the program

Currently, the following watershed plans exist within the service area: Cedar Creek WMP, St. Joseph River (Maumee) WMP, Lower St. Joseph River-Bear Creek WMP, St. Joseph River Watershed Initiative WMP, and St. Mary's WMP. However, IDNR will utilize the most current watershed planning information that is available as these plans are updated and/or new watershed plans are developed within this service area over the life of the program.

Hydric and partially hydric soils account for 616,250 acres, or 75.0% land cover, within the service area, out of which 456,438 acres have the potential to be restored. This was determined by mapping current hydric and partially hydric soils data with potentially restorable land cover types (e.g., cropland, pasture) located within the service area. Hotspots account for 330,730 acres of these potentially restorable wetlands within the service area. There are 5,685 acres of hotspots of potentially restorable wetlands adjacent to the Baltzell-Lenhart Woods Nature Preserve. The watershed with the most hotspots of potentially restorable wetlands is Holthouse Ditch (HUC 041000040501 [Table 8]). Approximately 2,779,740 linear feet of stream within the Maumee Service Area are located within 100 feet of agricultural fields; these linear feet of stream could provide opportunities for re-habilitation. Hotspots account for 1,111,924 linear feet of these potentially restorable streams within the service area. The watershed with the most hotspots of potentially restorable streams is Little Blue Creek (HUC 041000040404 [Table 9]). The watersheds with the most hotspots (Tables 8 & 9) serve as the basis for the priority areas. This program will focus on re-establishing and/or rehabilitating 15 acres of forested and/or scrub shrub wetland and 3000 linear feet of perennial headwater streams within the priority areas of this service area. These goals are assuming the program will absorb 60% of the anticipated required mitigation within the first three years of the program.

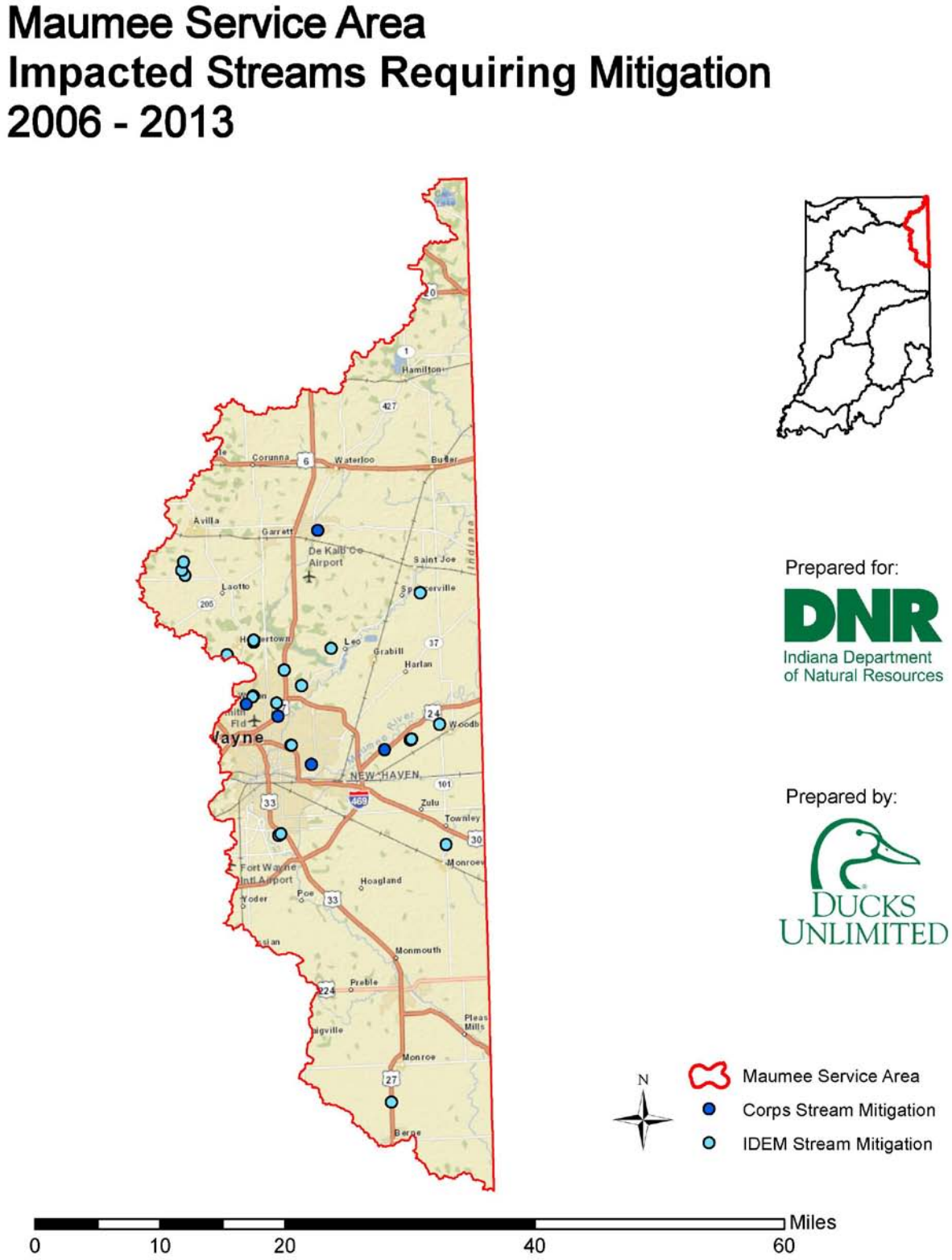


Figure 7. Impacted Streams Requiring Mitigation in the Maumee Service Area (2006-2013)

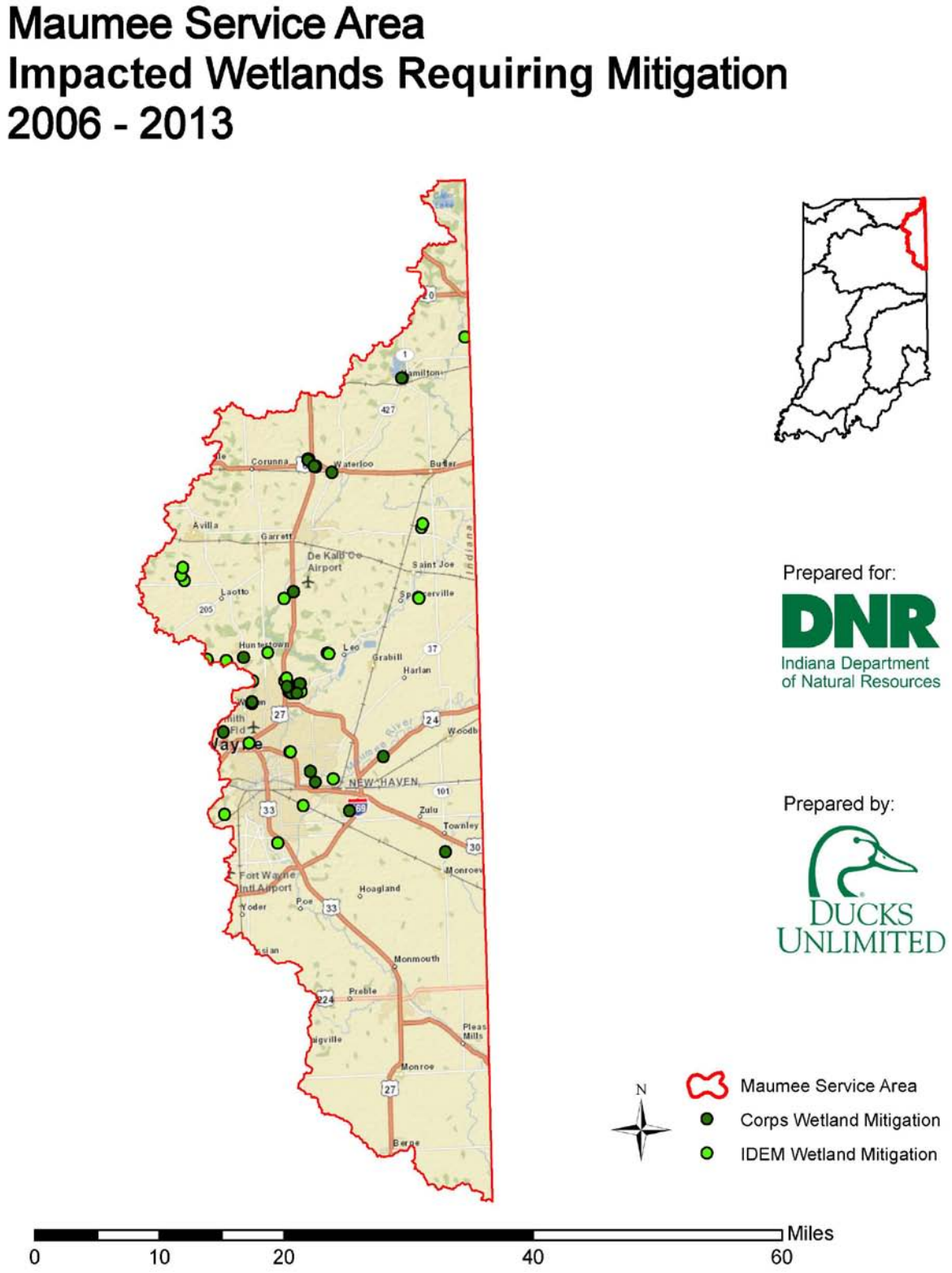


Figure 8. Impacted Streams Requiring Mitigation in the Maumee Service Area (2006-2013)

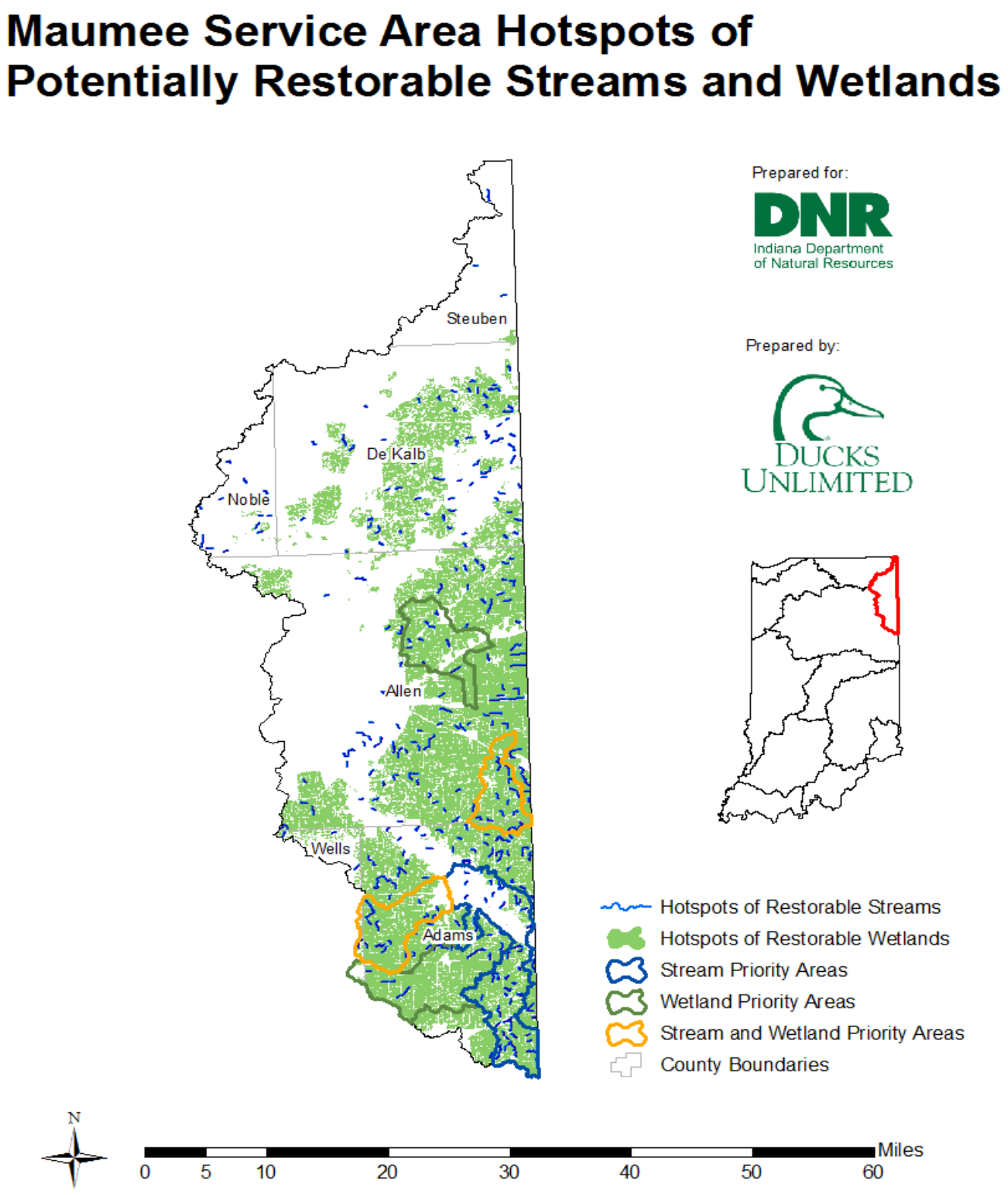


Figure 9. Hotspots of Potentially Restorable Streams and Wetlands in the Maumee Service Area

HUC 12 Code	HUC 12 Name	Hotspots of Potential Restorable Wetlands (acres)
041000040501	Holthouse Ditch	17,067
041000050105	Bottern Ditch-Maumee River	17,056
041000040406	Martz Creek	14,747
041000071204	Brown Ditch-Flatrock Creek	13,203
041000040403	Headwaters Blue Creek	13,057

Table 8: Watersheds in the Maumee Service Area with the most hotspots of potentially restorable wetlands

HUC 12 Code	HUC 12 Name	Hotspots of Potentially Restorable Streams (linear feet)
041000040404	Little Blue Creek	62,304
041000071204	Brown Ditch-Flatrock Creek	61,248
041000040501	Holthouse Ditch	54,912
041000040405	Blue Creek	51,216
041000040408	City of Decatur-St. Mary's River	49,104

Table 9: Watersheds in the Maumee Service Area with the most hotspots of potentially restorable streams

9.4 KANKAKEE SERVICE AREA

A. Service Area Description

The Kankakee Service Area is located in northwestern Indiana and is composed of the following two 8-digit HUCs which form the Kankakee River Basin:

- **07120001 - Kankakee**
- **07120002 - Iroquois**

The Kankakee Service Area includes all or portions of thirteen Indiana counties listed below in the Lake Region and Northern Moraine physiographic region.

Lake	Kosciusko	White
Porter	Marshall	Benton
LaPorte	Starke	Newton
St. Joseph	Pulaski	Jasper
Elkhart		

The Kankakee River Basin drains 1,913,059 acres within northwestern Indiana and is located in the Central Corn Belt Plains and Northern Indiana Drift Plains ecoregions. The western portion of the service area is located in the Central Corn Belt Plains and is predominantly rural. The eastern portion is located in the Northern Indiana Drift Plains and is characterized by greater woodlands, lower relief, and less urban-industrial activity than the western portion of the service area (Ecoregions of Indiana: U.S. EPA). The basin as a whole is characterized by its flat to rolling landscape and the channel of the Kankakee River valley which includes man-made drainage ditches and small areas of natural lakes and wetlands (IDNR Division of Water, 1990).

The primary major rivers within the service area are the Kankakee, Yellow, and Iroquois Rivers. Originating near South Bend, the Kankakee River flows southwest toward Illinois where it is joined with the Iroquois River, traveling west where it then converges with the Des Plaines River in Illinois to form the Illinois River.

The Kankakee Service Area is dominated by agriculture (72%) and deciduous forest (9.5%); in addition, woody wetlands and emergent herbaceous wetlands make up approximately 2.9% of the Kankakee Service Area (Fry, et al., 2011).

B. Resource Status (*historic impacts, current conditions, and threats*)

Existing within the Kankakee River Basin is the Grand Kankakee Marsh which was once home to one of the richest wildlife sources in North America (Everglades of the North- The Story of the Grand Kankakee Marsh, 2013). Prior to European settlement over 200 years ago, the Grand Kankakee Marsh spanned across nearly 500,000 acres and eight counties of Indiana and was one of the largest wetlands in the continental United States

(Grand Kankakee Marsh: U.S. FWS Division of Conservation Planning, 2011). The Kankakee River Basin provides habitat for migrating and breeding waterfowl as well as other wetland-associated wildlife species; numerous threatened and endangered species, both state and federal, depend upon the Kankakee River Basin which provides refuge to these species (Upper Mississippi River & Great Lakes Region Joint Venture, 1998).

Following the Civil War, agriculture was in high demand, and the Grand Kankakee Marsh was drained for its fertile soil; ditches were excavated and wetlands were drained to the Kankakee River (Kankakee River: IDNR). By 1923, nearly 250 miles of the Kankakee River were straightened and dredged into what is now a 90 mile long ditch; these draining practices drastically decreased the migratory bird population within the United States (Everglades of the North- The Story of the Grand Kankakee Marsh, 2013). Today, less than 30,000 acres, or 6%, of the Grand Kankakee Marsh exists within the Kankakee Watershed due to human alterations (The Kankakee River Valley: IDNR, 1997). Approximately 87% of the Grand Kankakee Marsh has been lost to draining and farmland conversion alone (Schoon, 2013), and of the 1.9 million acre Kankakee River Basin within Indiana, 1.6 million acres (84%) are currently being utilized as farmland (Kankakee River Basin Commission, 2012).

Historically, sedimentation was the main cause of water quality issues within the Kankakee River Basin, especially within the Kankakee River. Hydromodification was the primary source of impairments, causing streambank erosion, reduction in aquatic fauna diversity, loss of habitat, and growth suppression. The results from stream channelization within the Kankakee River Basin are still evident today (Ivens, Bhowmik, Brigham, & Gross, 1981).

More recently, IDEM reported that the leading causes of impairment to the streams of the Kankakee Service Area were impaired biotic communities, dissolved oxygen, E. coli, and PCBs and mercury in fish tissue. Additional causes included nutrients and chloride. Common causes of impairments to freshwater lakes within the service area were pH and phosphorus (Indiana Integrated Water Monitoring and Assessment Report to the U.S. EPA: IDEM, 2012).

Total wetland acreage within the Kankakee Service Area is approximately 86,988 acres, or 4.6% land cover of the service area; the most prominent wetland type within the service area is freshwater forested/shrub wetland, totaling 43,685 acres, or 2.3% total land cover within the service area.

Impact data from 2006-2013 in the Kankakee Service Area were collected from the USACE and IDEM and analyzed. During this recent time period, 39 acres of impacted wetlands and 2,115 linear feet of impacted streams required mitigation according to the data from the USACE and 34 acres of impacted wetlands and 15,626 linear feet of impacted streams required mitigation according to the data from IDEM.

C. Compensatory Mitigation Approach & Priorities

Habitat alteration is a common cause of aquatic resource impairments in the Kankakee Service Area, often resulting in biodiversity loss, impacts to aquatic fauna and flora, and water quality degradation. Wetland restoration will focus on re-establishing and rehabilitating agricultural lands to forested wetlands including consideration of historic oxbows. Stream restoration will focus on connecting streams to floodplains with riparian buffers. This service area has a significant amount of regulated drains that will make this a more difficult priority.

Coordination with the Kankakee River Basin Commission may be a beneficial resource since it has a wide range of representation on the Commission from other local agencies and organizations.

Currently, the following land trusts exist within the service area: Woodland Savanna Land Conservancy, Trillium Land Conservancy, Wood-Land-Lakes RC&D Council, LaPorte County Conservation Trust, ACRES Land Trust, and NICHES Land Trust. There is the potential for land trusts to dissolve, adjust their geographical boundaries,

and for new land trust organizations to be created within the service area. IDNR will work with the land trusts that exist in the service area over the life of the program

Currently, the following watershed plans exist within the service area: Flat Lake (subwatershed) WMP, Lake of the Woods (subwatershed) WMP, NIRPC WMP, and Upper Iroquois WMP. However, IDNR will utilize the most current watershed planning information that is available as these plans are updated and/or new watershed plans are developed within this service area over the life of the program.

Hydric and partially hydric soils account for 1,049,542 acres, or 54.9% land cover, within the service area, out of which 843,165 acres have the potential to be restored. This was determined by mapping current hydric and partially hydric soils data with potentially restorable land cover types (e.g., cropland, pasture) located within the service area. Hotspots account for 558,815 acres of these potentially restorable wetlands within the service area. Approximately 3,176 acres of these hotspots of potential restorable wetlands are on IDNR-managed lands within the Kankakee Service Area. Approximately 8,968 linear feet of hotspots of potential restorable wetlands are on IDNR-managed lands within the Kankakee Service Area. Approximately 138,899 acres of hotspots of potentially restorable wetlands are adjacent to IDNR-managed lands in the service area. Approximately 17,099 linear feet of hotspots of potentially restorable streams are adjacent to IDNR-managed lands in the service area. Kankakee Fish and Wildlife Area is the IDNR-managed land within the Kankakee Service Area with the most adjacent acres of hotspots of potentially restorable wetlands (39,708 acres). Other IDNR-managed lands within the Kankakee Service area with high amounts of adjacent acres of hotspots of potentially restorable wetlands include Jasper-Pulaski Fish and Wildlife Area (34,105 acres) and Willow Slough Fish and Wildlife Area (34,105 acres). . The Jefvert Gamebird Habitat Area is the IDNR-managed land within the Kankakee Service Area with the most adjacent linear feet of hotspots of potentially restorable streams (5,545 linear feet). The watershed with the most hotspots of potentially restorable wetlands is Coon Creek-Mud Creek (HUC 071200020702 [Table 10]). Approximately 3,231,360 linear feet of streams in the Kankakee Service Area are located within 100 feet of agricultural fields; these linear feet of stream could provide opportunities for re-habilitation. Hotspots account for 1,626,240 linear feet of these potentially restorable streams within the service area. The watershed with the most hotspots of potentially restorable streams is Brown Ditch (HUC 071200011307 [Table 11]). The watersheds with the most hotspots (Tables 10 & 11) serve as the basis for the priority areas. This program will focus on re-establishing and/or rehabilitating 10 acres of forested wetland and 500 linear feet of perennial headwater streams within the priority areas of this service area. These goals are assuming the program will absorb 60% of the anticipated required mitigation within the first three years of the program.

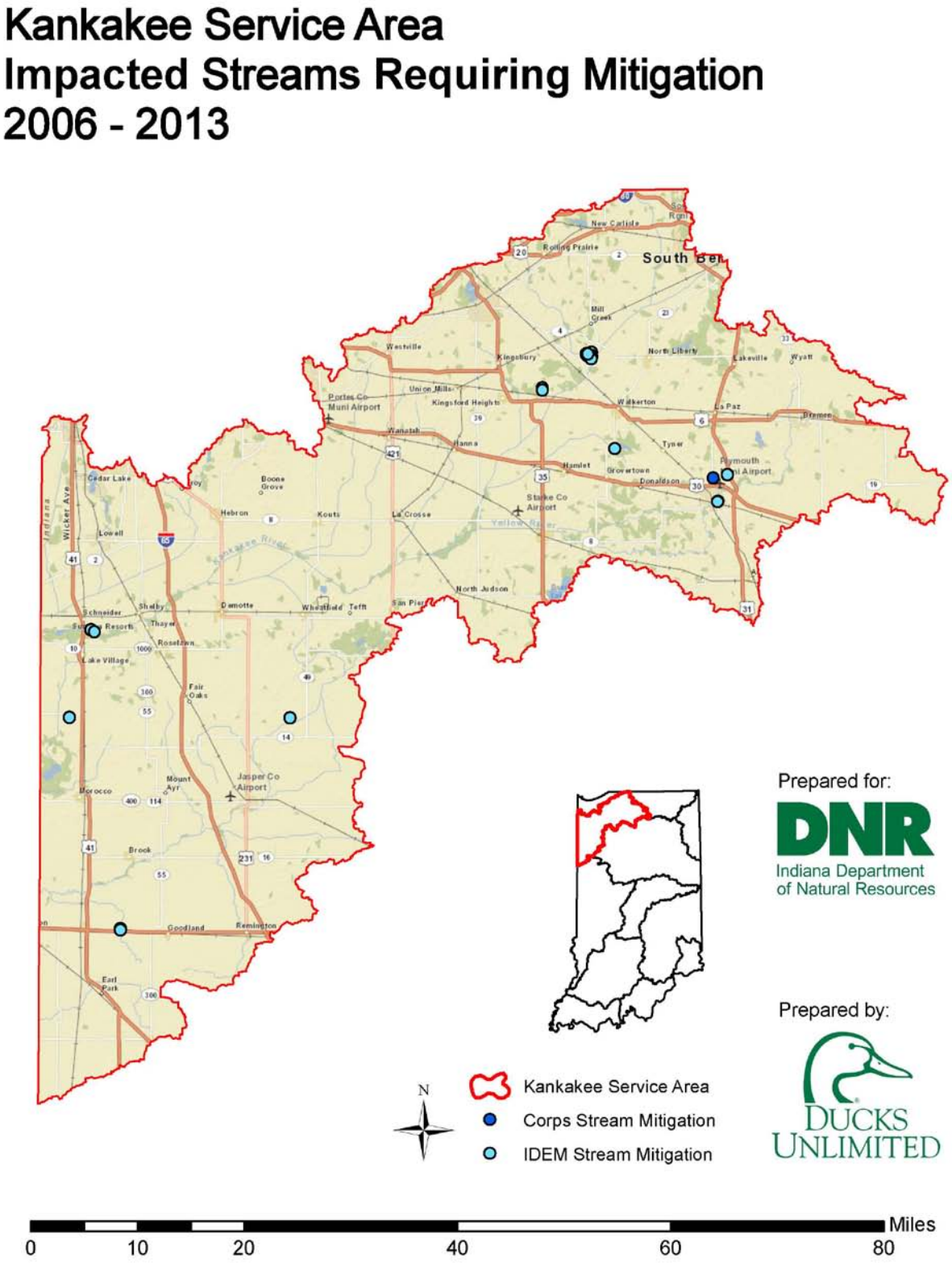


Figure 10. Impacted Streams Requiring Mitigation in the Kankakee Service Area (2006-2013)

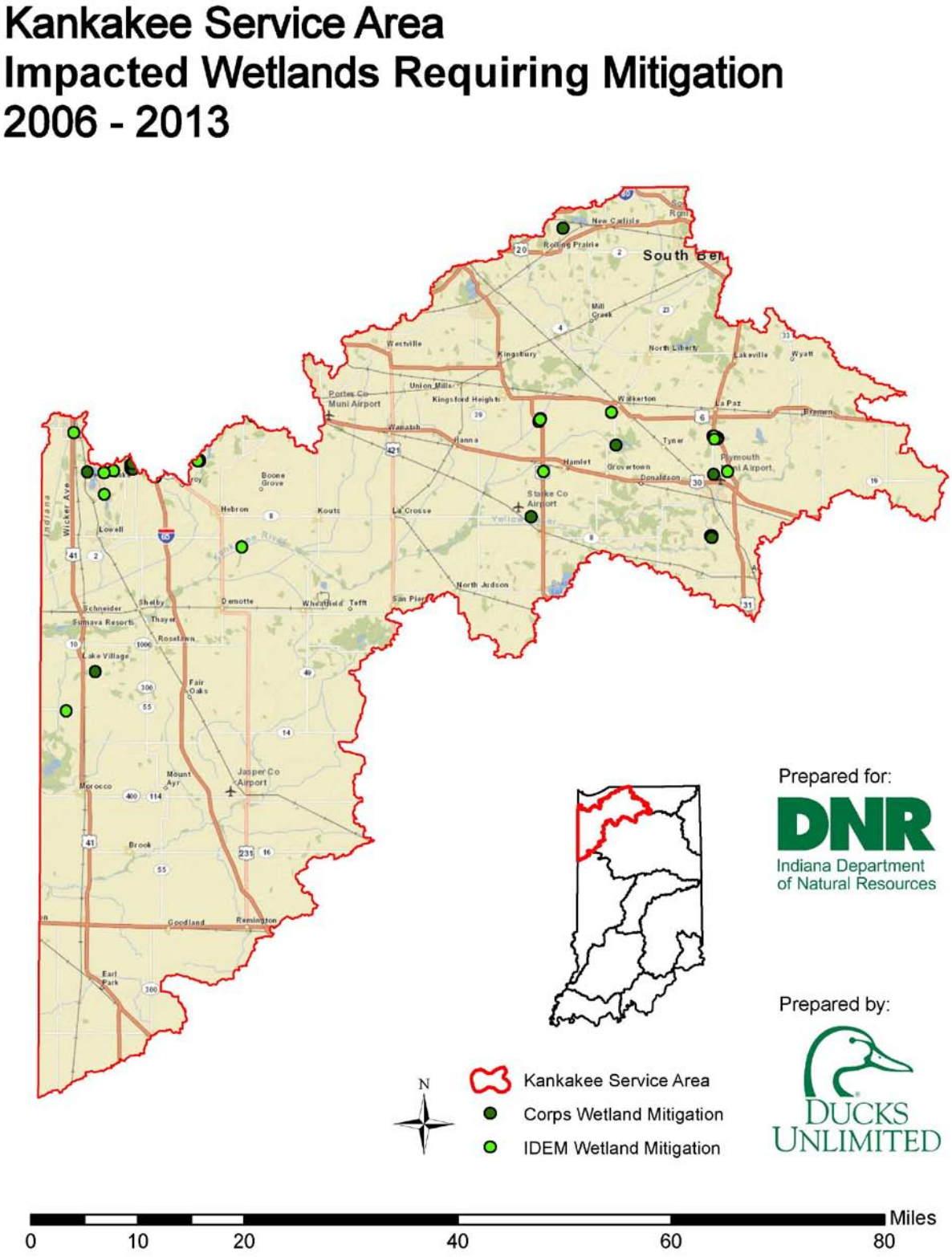


Figure 11. Impacted Wetlands Requiring Mitigation in the Kankakee Service Area (2006-2013)

Kankakee Service Area Hotspots of Potentially Restorable Streams and Wetlands

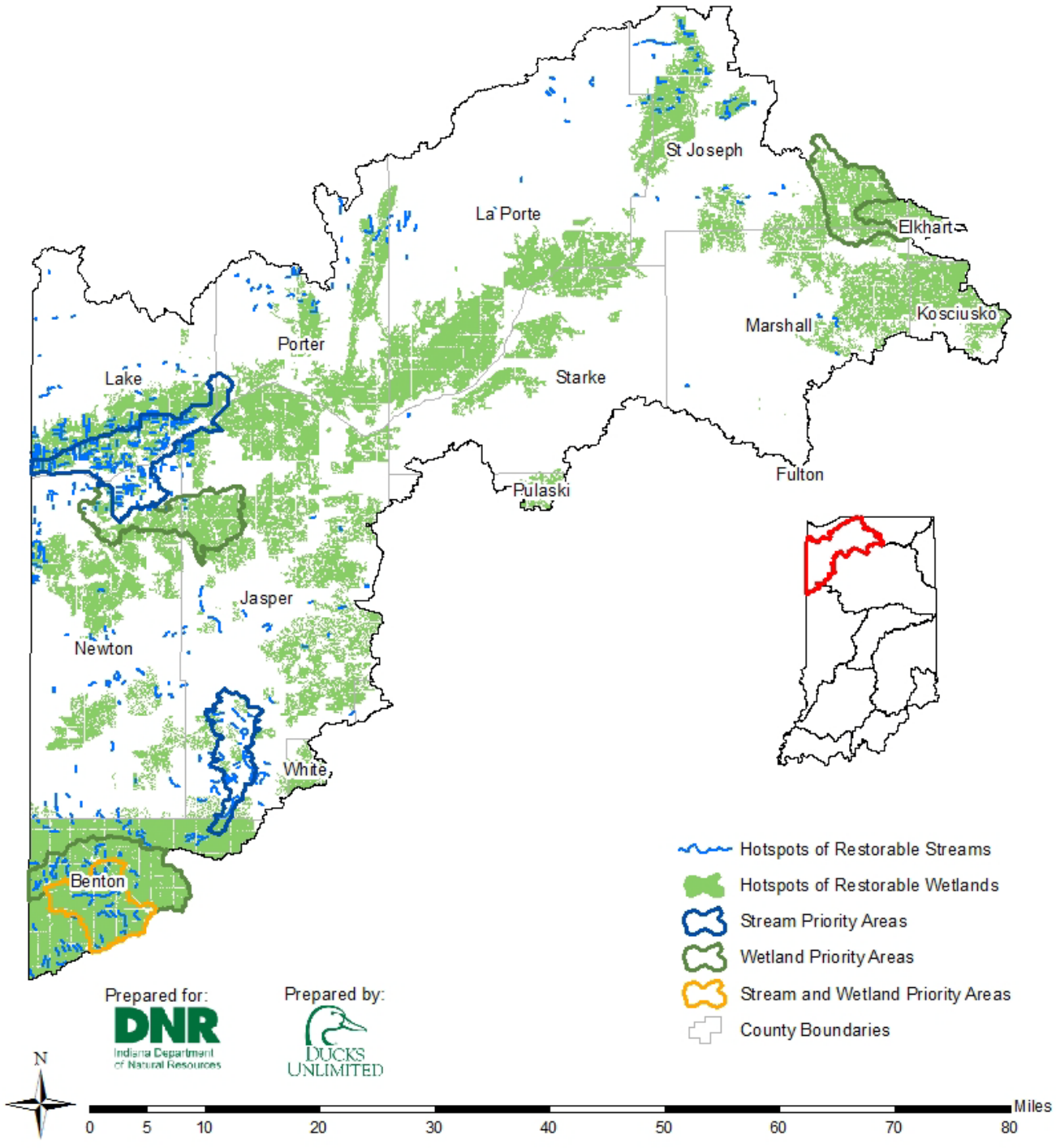


Figure 12. Hotspots of Potentially Restorable Streams and Wetlands in the Kankakee Service Area

HUC 12 Code	HUC 12 Name	Hotspots of Potentially Restorable Wetlands (acres)
071200020702	Coon Creek-Mud Creek	22,768
071200011102	Wentworth Ditch-Knight Ditch	17,807
071200010302	Kline Rouch Ditch-Yellow River	16,022
071200020705	Yeagers Curve-Sugar Creek	14,621
071200020701	Upper Sugar Creek-Sugar Creek	13,331

Table 10: Watersheds in the Kankakee Service Area with the most hotspots of potentially restorable wetlands

HUC 12 Code	HUC 12 Name	Hotspots of Potentially Restorable Streams (linear feet)
071200011307	Brown Ditch	142,959
071200011204	Williams Ditch	133,344
071200020205	Carpenter Creek	105,667
071200020702	Coon Creek-Mud Creek	85,727
071200011103	Brown Levee Ditch-Kankakee River	76,071

Table 11: Watersheds in the Kankakee Service Area with the most hotspots of potentially restorable streams

9.5 UPPER WABASH SERVICE AREA

A. Service Area Description

The Upper Wabash Service Area is located in northern Indiana and is composed of the following seven 8-digit HUCs:

- **05120106 - Tippecanoe**
- **05120105 - Middle Wabash-Deer**
- **05120107 - Wildcat**
- **05120104 - Eel**
- **05120101 - Upper Wabash**
- **05120102 - Salamonie**
- **05120103 - Mississinewa**

The Upper Wabash Service Area includes all or portions of twenty-eight Indiana counties listed below and is located primarily in the Central Till Plain physiographic region.

Kosciusko	Tipton	Fulton
Noble	Clinton	Cass
Whitley	Tippecanoe	Carroll
Allen	Benton	Howard
Adams	White	Miami
Jay	Jasper	Wabash
Randolph	Pulaski	Huntington
Blackford	Starke	Grant
Delaware	Marshall	Wells
Madison		

The Upper Wabash Service Area is the largest of the eleven service areas having an area of 6,915 square miles; this area accounts for over 22% of the entire state of Indiana. The service area is located primarily in the Eastern Corn Belt Plains ecoregion; the eastern portion is within the Clayey, High Lime Till Plains sub-region and is characterized by soils which are less productive and more artificially drained than the western portion of the service area located in the Loamy, High Lime Till Plains sub-region. The Loamy, High Lime Till Plains area is characterized by soils that developed from limy, loamy, glacial deposits. Currently, both sub-regions are dominated by corn, wheat, soybean, and livestock farming. The northwestern-most portion of the service area is located in the Northern Indiana Drift Plains ecoregion; the land is flat to rolling and is characterized by its dunes, end moraines, and lacustrine deposits with its tributaries being fed by a significant amount of groundwater. In

addition, the northernmost portion of the service area is characterized by pothole lakes, ponds, marshes, bogs, and clear streams; the area is dominated by corn, soybean, and livestock farming (Ecoregions of Indiana: U.S. EPA).

Primary rivers flowing through the Upper Wabash Service Area are the Wabash River and its many tributaries, including the Mississinewa, Eel, Tippecanoe, White, and Vermilion Rivers as well as Sugar Creek and Wildcat Creek. The Wabash River originates as a drainage ditch in Ohio and enters Indiana in Jay County. It flows northwest towards the Little Wabash River near Huntington County and continues west and converges with the Eel River in Cass County. An additional confluence of this river occurs in Tippecanoe County with the Tippecanoe River; from here, the Wabash River flows through the Middle Wabash Service Area in Tippecanoe County, eventually confluences with the Ohio River.

The Upper Wabash Service Area is dominated by agriculture (77%), deciduous forest (8.6%), and developed, open land; woody wetlands and emergent herbaceous wetlands compose less than one percent of the land cover within the Upper Wabash Service Area (Fry, et al., 2011).

B. Resource Status (*historic impacts, current conditions, and threats)*

Shorelines of the natural lakes within the Upper Wabash Service Area, more specifically within the Tippecanoe Watershed (HUC-05120106), have been altered by humans throughout history, resulting in the loss of important lacustrine wetland areas. These alterations were caused by a variety of activities such as road construction and residential development. As a result of these alterations, natural areas have been fragmented and biodiversity has been significantly reduced. This decrease in diversity and productivity has ultimately caused a decrease in the health of aquatic ecosystems existing within lacustrine wetlands; human activities have proven to be primarily responsible for the degradation of plant communities, wildlife habitat, and water quality of these wetlands (Price, 2009).

Historically, sedimentation by hydromodification and nutrients from agricultural and urban runoff were the main causes of water quality issues within the Upper Wabash Service Area, especially along the Wabash River and its major tributaries. Hydromodification frequently causes streambank erosion, and sedimentation reduces aquatic habitat, spawning, and feeding areas for aquatic organisms. The Upper Wabash has the greatest amount of hydromodification of the service areas due to impoundments such as the Huntington, Salamonie, and Mississinewa Reservoirs as well as impoundments on the Tippecanoe River such as Lake Shafer and Freeman Lake. These impoundments have modified the natural flow regime of streams within the service area, often resulting in the degradation of stream banks and beds in addition to habitat alterations which significantly altered habitat for aquatic biota and decreased biodiversity.

More recently, IDEM reported that the leading causes of impairment to the streams of the Upper Wabash Service Area were E. coli, impaired biotic communities, and PCBs and mercury in fish tissue (Indiana Integrated Water Monitoring and Assessment Report to the U.S. EPA: IDEM, 2012). Hydromodification and nonpoint source pollutants continue to threaten aquatic biota of the Wabash River and its tributaries.

Total wetland acreage within the Upper Wabash Service Area is approximately 196,173 acres, or 4.4% land cover of the service area; the most prominent wetland type within the service area is freshwater forested/shrub wetland, totaling 93,435 acres, or 2.1% total land cover within the service area. The southern and western areas of the service area contain the least amount of wetlands (The Status of Wetlands in Indiana: IDNR, 1996); a majority of the service area is dominated by agriculture.

Impact data from 2006-2013 in the Upper Wabash Service Area were collected from the USACE and IDEM and analyzed. During this recent time period, 57 acres of impacted wetlands and 33,090 linear feet of impacted

streams required mitigation according to the data from the USACE and 87 acres of impacted wetlands and 22,393 linear feet of impacted streams required mitigation according to the data from IDEM.

C. Compensatory Mitigation Approach & Priorities

Habitat conversion has been and continues to be a common cause of aquatic resource impairments in the Upper Wabash Service Area. This conversion results in impacts to aquatic fauna and flora as well as water quality degradation. In addition, hydromodification has been a main source of stream impairments, often causing a decrease in biodiversity. Wetland mitigation projects will focus on forested and scrub-shrub wetlands to the landscape. A supplemental goal will be groundwater seep wetlands and bogs. Stream mitigation projects will focus on re-establishing stream plan and profile, connecting streams to floodplains and re-establishing riparian buffers.

Impacts to freshwater lakes caused by a variety of alterations such as agriculture establishment and urbanization have also impacted aquatic fauna and flora. An additional focus of mitigation projects within the Upper Wabash Service Area will be those that provide benefits and alleviate threats to these lakes. Additionally, coordination with the Wabash River Heritage Corridor Commission for projects within the Wabash River will also be pursued.

Currently, the following land trusts exist within the service area: Woodland Savanna Land Conservancy, Trillium Land Conservancy, Wawassee Area Conservation Fund, Little River Wetlands Project, Wood-Land-Lakes RC&D Council, ACRES Land Trust, NICHES Land Trust, Red-tail Conservancy, and Central Indiana Land Trust. There is the potential for land trusts to dissolve, adjust their geographical boundaries, and for new land trust organizations to be created within the service area. IDNR will work with the land trusts that exist in the service area over the life of the program

Currently, the following watershed plans exist within the service area: Eel River-Tick Creek WMP, Eel River (middle) WMP, Limberlost-Loblolly WMP, Upper Wabash River WMP, Mud Creek Headwaters WMP, Pete's Run WMP, Stahl Ditch-Kitty Run WMP, Turkey Creek/Askren/Round Prairie Creek WMP, and Upper Tippecanoe River WMP. However, IDNR will utilize the most current watershed planning information that is available as these plans are updated and/or new watershed plans are developed within this service area over the life of the program.

Hydric and partially hydric soils account for 2,424,456 acres, or 54.8% land cover, within the service area, out of which 2,000,845acres have the potential to be restored. This was determined by mapping current hydric and partially hydric soils data with potentially restorable land cover types (e.g., cropland, pasture) located within the service area. The Upper Wabash Service Area contains the greatest area of hydric and partially hydric soils and also has the greatest area of potentially restorable land out of all of the service areas in the state. Hotspots account for 1,391,544 acres of these potentially restorable wetlands within the service area. Approximately 55,455 acres of hotspots of potentially restorable wetlands are adjacent to IDNR-managed lands. Howat 80 Wildlife Management Area is the IDNR-managed land with the most adjacent hotspots of potentially restorable wetlands (13,801 acres). Winamac Fish and Wildlife Area is the IDNR-managed land with the Upper Wabash Service Area with the most adjacent acres identified as hotspots of potential restorable wetlands, followed by Roush Lake Fish and Wildlife Area. The watershed with the most hotspots of potentially restorable wetlands is Pipe Creek (HUC 0512010115 [Table 12]). Approximately 12,677,280 linear feet of streams within the Upper Wabash Service Area are located within 100 feet of agricultural fields; these linear miles of stream could provide opportunities for re-habilitation. Hotspots account for 5,290,560 linear feet of these potentially restorable streams within the service area. There are approximately 6,716 linear feet of potentially restorable streams adjacent to IDNR-managed lands. Randolph County Wildlife Management Area is the IDNR-owned land with the most adjacent hotspots of potentially restorable streams (2,180 linear feet), followed by Loblolly Marsh Nature Preserve (1,401 linear feet). The watershed with the most hotspots of potentially restorable streams is Black

Creek-Salamonie River (HUC 0512010203 [Table 13]). The watersheds with the most hotspots (Tables 12 & 13) serve as the basis for stream and wetland mitigation priority areas. This program will focus on re-establishing and/or rehabilitating 15 acres of forested and/or scrub shrub wetland and 5250 linear feet of perennial headwater streams within the priority areas of this service area. These goals are assuming the program will absorb 60% of the anticipated required mitigation within the first three years of the program.

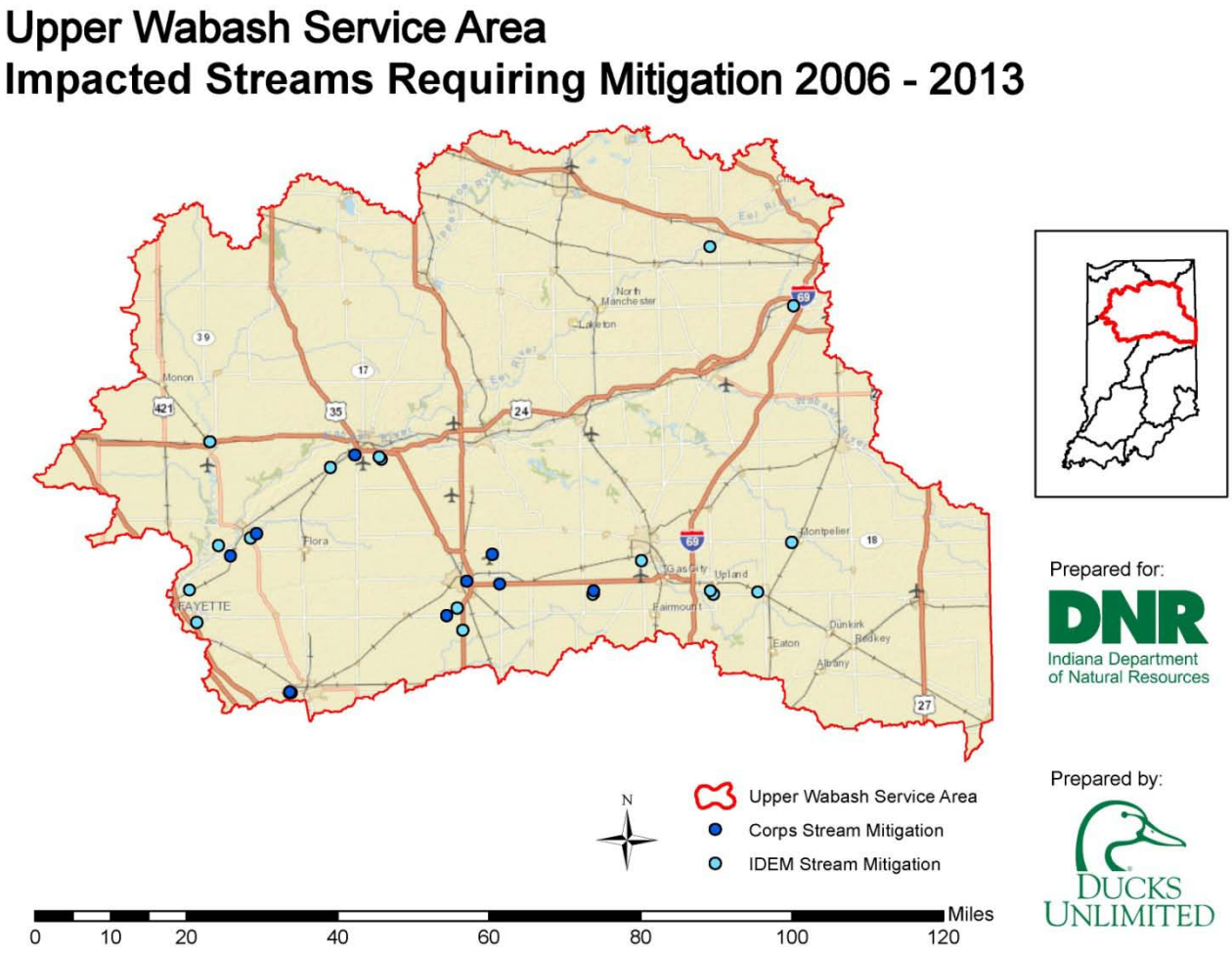


Figure 13. Impacted Streams Requiring Mitigation in the Upper Wabash Service Area (2006-2013)

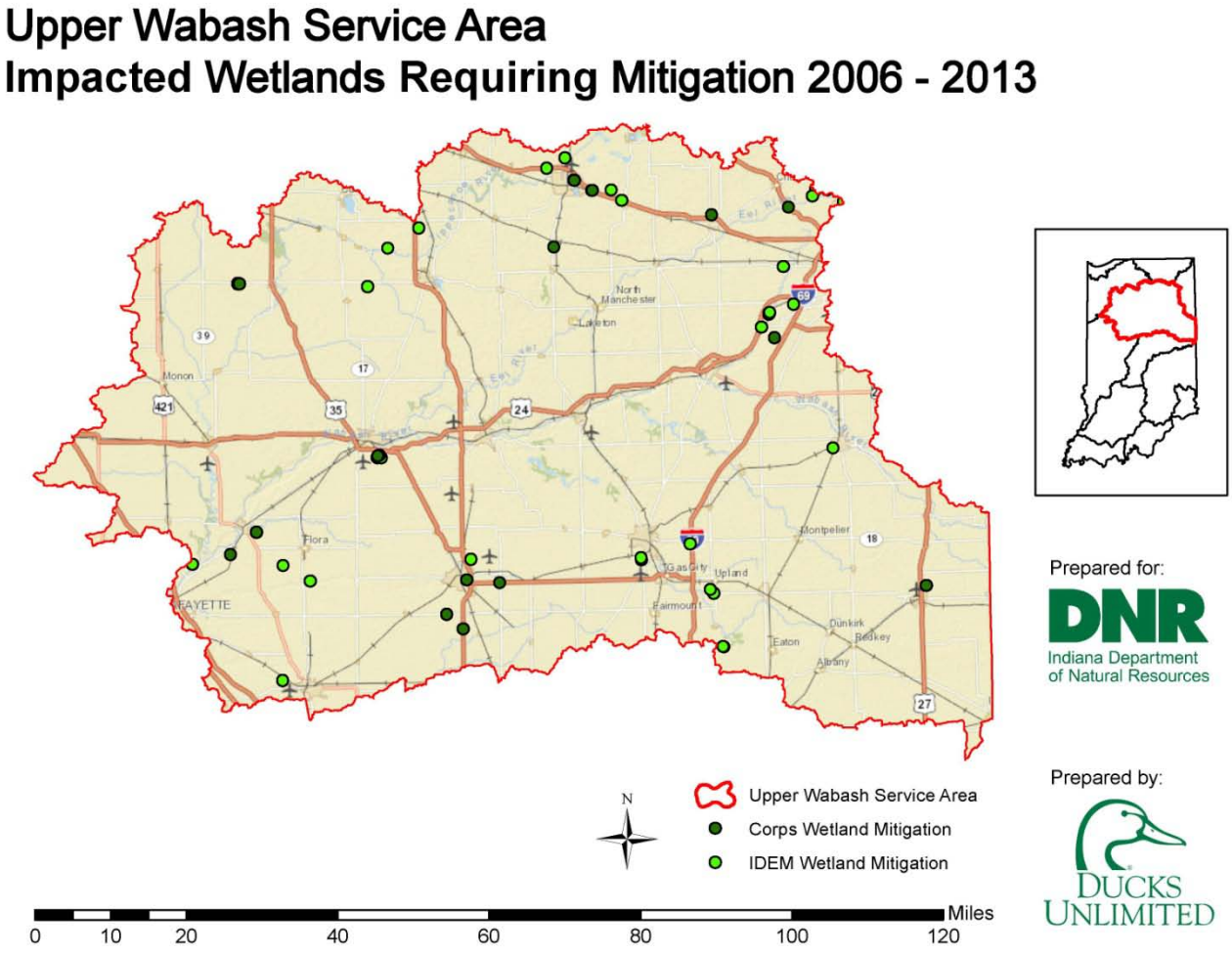


Figure 14. Impacted Wetlands Requiring Mitigation in the Upper Wabash Service Area (2006-2013)

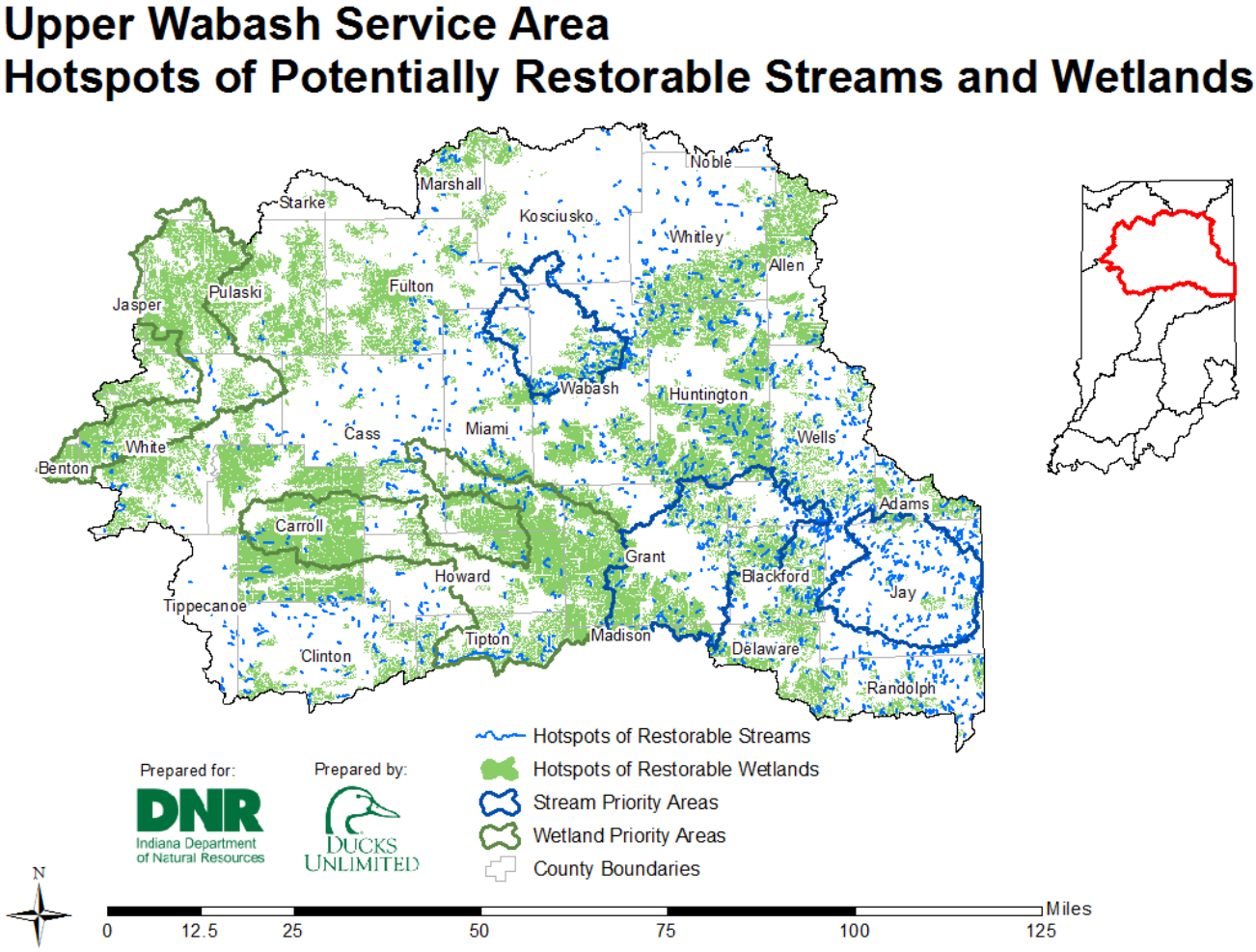


Figure 15. Hotspots of Potentially Restorable Streams and Wetlands in the Upper Wabash Service Area

HUC 10 Code	HUC 10 Name	Hotspots of Potentially Restorable Wetlands (acres)
0512010115	Pipe Creek	80,068
0512010505	Deer Creek	74,427
0512010610	Big Monon Ditch	68,384
0512010612	Honey Creek-Tippecanoe River	64,875
0512010701	Kokomo Creek-Wildcat Creek	67,036

Table 12: Watersheds in the Upper Wabash Service Area with the most hotspots of potentially restorable wetlands

HUC 10 Code	HUC 10 Name	Hotspots of Potentially Restorable Streams (linear feet)
0512010203	Black Creek-Salamonie River	259,248
0512010201	Brooks Creek-Salamonie River	244,992
0512010104	Loblolly Creek	225,984
0512010405	Paw Paw Creek-Eel River	223,872
0512010305	Massey Creek-Mississinewa River	223,344

Table 13: Watersheds in the Upper Wabash Service Area with the most hotspots of potentially restorable streams

9.6 MIDDLE WABASH SERVICE AREA

A. Service Area Description

The Middle Wabash Service Area is located in western Indiana and is composed of all or part of the following six 8-digit HUC watersheds:

- **05120109 - Vermilion**
- **05120108 - Middle Wabash-Little Vermilion**
- **05120110 - Sugar**
- **05120111 - Middle Wabash-Busseron**
- **05120203 - Eel**
- **05120113 - Lower Wabash (small portion)**

The Middle Wabash Service Area includes all or portions of twenty Indiana counties listed below and is located primarily within both the Central Till Plain and Southern Hills and Lowlands physiographic regions.

Knox	Putnam	Clinton
Sullivan	Parke	Tipton
Greene	Hendricks	Tippecanoe
Owen	Vermilion	Warren
Clay	Boone	Benton
Vigo	Montgomery	White
Morgan	Fountain	

The Middle Wabash Service Area drains approximately 5,415 square miles of western Indiana and is located in a variety of ecoregions; the northernmost portion is located in Central Corn Belt Plains; the east-central portion is within Eastern Corn Belt Plains and Interior Plateau; the south-central portion of the service area is in Interior River Valleys and Hills. In the north, the land is characterized by dark, fertile soils; the land was once covered by prairie and oak-hickory forests but has been converted to agriculture. The southern area is composed of wide, flat-bottomed terraced valleys and dissected glacial till plains and contain loamy to sandy till deposits. The southern half of the Middle Wabash Service Area contains a large amount of Indiana's surface and underground mines, mainly in the Lower Wabash and Eel Watersheds. The remainder of the region in the east is primarily a level till-plain with broad bottomlands and is characterized by soils which developed from loamy, limy glacial deposits; the soils are productive for agricultural crops, and a majority of the land use is agricultural (Ecoregions of Indiana: U.S. EPA).

The Wabash River enters the Middle Wabash Service Area in Tippecanoe County after its confluence with the Tippecanoe River and Wildcat Creek. The Wabash River travels south through Warren and Fountain Counties where it flows along the Indiana/Illinois border beginning in Vigo County; primary tributaries of the Wabash River within this service area include Sugar Creek, the Vermilion and Little Vermilion Rivers, and Big Raccoon Creek.

The Middle Wabash Service Area is dominated by agriculture (63.6%) and deciduous forest (19.8%); woody wetlands and emergent herbaceous wetlands accounted for less than one percent of the total land cover (Fry, et al., 2011).

B. Resource Status (*historic impacts, current conditions, and threats*)

During the early 1900s, the Wabash River within the Middle Wabash Service Area was characterized as being brown and opaque with suspended sediments from Attica to Vermilion County. Reports from the mid-1990s identified sewage, mill and cannery waste, coal mine drainage, and dairy production wastes as sources of water quality impairments within the middle Wabash River, and increased flooding caused by an inadequate number of runoff channels and man-made landscape alterations; the Wabash River and its tributaries were polluted as a result of flood events. Up until the mid-1980s, the Wabash River continued to be degraded due to agricultural development and urbanization. Since this time, major improvements to water quality have been made, such as point source pollution reductions; however, high nutrient concentrations and PCB and mercury levels in fish tissue continue to exist within areas of the river and its tributaries (Wabash River Enhancement Corporation, 2011).

Historically, a majority of mined land in the western region of the Middle Wabash Service Area was abandoned without any restoration efforts; acid mine drainage degraded many aquatic systems due to low pH to the point where aquatic areas were devoid of local flora and fauna. Historical impacts from coal mining activities in the area included seeping, acidic water and heavy metals contamination (IDNR Division of Reclamation, 2010).

Existing within the Middle Wabash Service Area is the Region of the Great Bend of the Wabash River near the city of Lafayette. Nearly 42% (200 square miles) of this area contains tile-drained soils, and many invasive species impact portions of the area (Wabash River Enhancement Corporation, 2011). There are several large areas of human-disturbed land in the service area, particularly in Vermillion, Vigo, Clay and Parke Counties. Siltation, nutrients, and rapid drainage due to field tiling are additional impacts of agricultural activities existing within the service area (USACE Louisville District, 2011).

More recently, IDEM reported that the leading causes of impairment to the streams of the Upper Wabash Service Area were E. coli, impaired biotic communities, PCBs and mercury in fish tissue, and dissolved oxygen. Freshwater lake impairments were caused by phosphorus and pH (Indiana Integrated Water Monitoring and Assessment Report to the U.S. EPA: IDEM, 2012).

Total wetland acreage within the Middle Wabash Service Area is approximately 148,707 acres, or 4.3% land cover of the service area; the most prominent wetland type within the service area is freshwater forested/shrub wetland, totaling 76,127 acres, or 2.2% total land cover within the service area. Wetlands are most prominent along the Wabash River and its tributaries; wetland densities are most scarce in the Central Corn Belt Plains and Eastern Corn Belt Plains ecoregions in counties such as Montgomery, Putnam, and Warren (The Status of Wetlands in Indiana: IDNR, 1996).

Impact data from 2006-2013 in the Middle Wabash Service Area were collected from the USACE and IDEM and analyzed. During this recent time period, 76 acres of impacted wetlands and 51,156 linear feet of impacted streams required mitigation according to the data from the USACE and 91 acres of impacted wetlands and 28,741 linear feet of impacted streams required mitigation according to data from IDEM.

C. Compensatory Mitigation Approach & Priorities

Habitat conversion is the primary source of aquatic resource impairments in the Middle Wabash. Wetland mitigation projects will focus on forested and emergent wetland systems along the Wabash River. Stream mitigation projects will focus on re-establishing plan and profile, floodplain connectivity, and riparian buffers along tributaries to the Wabash River.

Impacts to freshwater lakes caused by a variety of alterations such as agriculture establishment and urbanization have resulted in habitat loss and have impacted aquatic fauna and flora. An additional focus of mitigation projects within the Middle Wabash Service Area will be those that provide ecological benefits and alleviate threats to these lakes. Additionally, coordination with the IDNR Healthy Rivers Initiative and the Wabash River Heritage Corridor Commission within the Wabash River will also be pursued.

Currently, the following land trusts exist within the service area: Ouabache Land Conservancy, Indiana Karst Conservancy, Four Rivers RC&D, NICHES Land Trust, Sycamore Land Trust, and Central Indiana Land Trust. There is the potential for land trusts to dissolve, adjust their geographical boundaries, and for new land trust organizations to be created within the service area. IDNR will work with the land trusts that exist in the service area over the life of the program

Currently, the following watershed plans exist within the service area: Big Walnut-Deer Creeks WMP, Busseron Creek WMP, Lake Manitou WMP, Lake Maxinkuckee WMP, Little Sugar Creek WMP, Little Vermillion River WMP, Little Wildcat Creek WMP, Lower Eel River WMP, Region of the Great Bend of the Wabash River WMP, South Fork Wildcat WMP, Lauramie Creek WMP, Spring Creek-Lick Run WMP, and Turtle Creek WMP. However, IDNR will utilize the most current watershed planning information that is available as these plans are updated and/or new watershed plans are developed within this service area over the life of the program.

Hydric and partially hydric soils account for 986,737 acres, or 28.5% land cover, within the service area, out of which 864,075 acres have the potential to be restored. This was determined by mapping current hydric and partially hydric soils data with potentially restorable land cover types (e.g., cropland, pasture) located within the service area. Hotspots account for 522,766 acres of these potentially restorable wetlands within the service area. Approximately 1033 acres of these hotspots of potentially restorable wetlands are on IDNR-owned lands within the Middle Wabash Service Area. Approximately 62,565 acres of hotspots of potentially restorable wetlands are adjacent to IDNR-managed lands within the Middle Wabash Service Area. Pine Creek Bottoms Gamebird Habitat Area is the IDNR-managed land in the Middle Wabash Service Area with the most adjacent acres of hotspots of potentially restorable wetlands (42,054 acres). The watershed with the most hotspots of potentially restorable wetlands is Big Pine Creek (HUC 0512010804 [Table 14]). Approximately 12,260,160 linear feet of stream within the Middle Wabash Service Area are located within 100 feet of agricultural fields; these linear feet of stream could provide opportunities for re-habilitation. Hotspots account for 4,366,560 linear feet of these potentially restorable streams within the service area. Approximately 13,921 linear feet of hotspots of potentially restorable streams are adjacent to IDNR-managed lands. McClellen Gamebird Habitat Area is the IDNR-managed land with the most adjacent hotspots of potentially restorable streams (4,376 linear feet). The watershed with the most hotspots of potentially restorable streams is Mill Creek (HUC 0512020305 [Table 15]). The watersheds with the most hotspots (Tables 14 & 15) are the basis for stream and wetland mitigation priority areas. This program will focus on re-establishing and/or rehabilitating 20 acres of forested and/or emergent wetland and 6500 linear feet of perennial tributary streams within the priority areas of this service area. These goals are assuming the program will absorb 60% of the anticipated required mitigation within the first three years of the program.

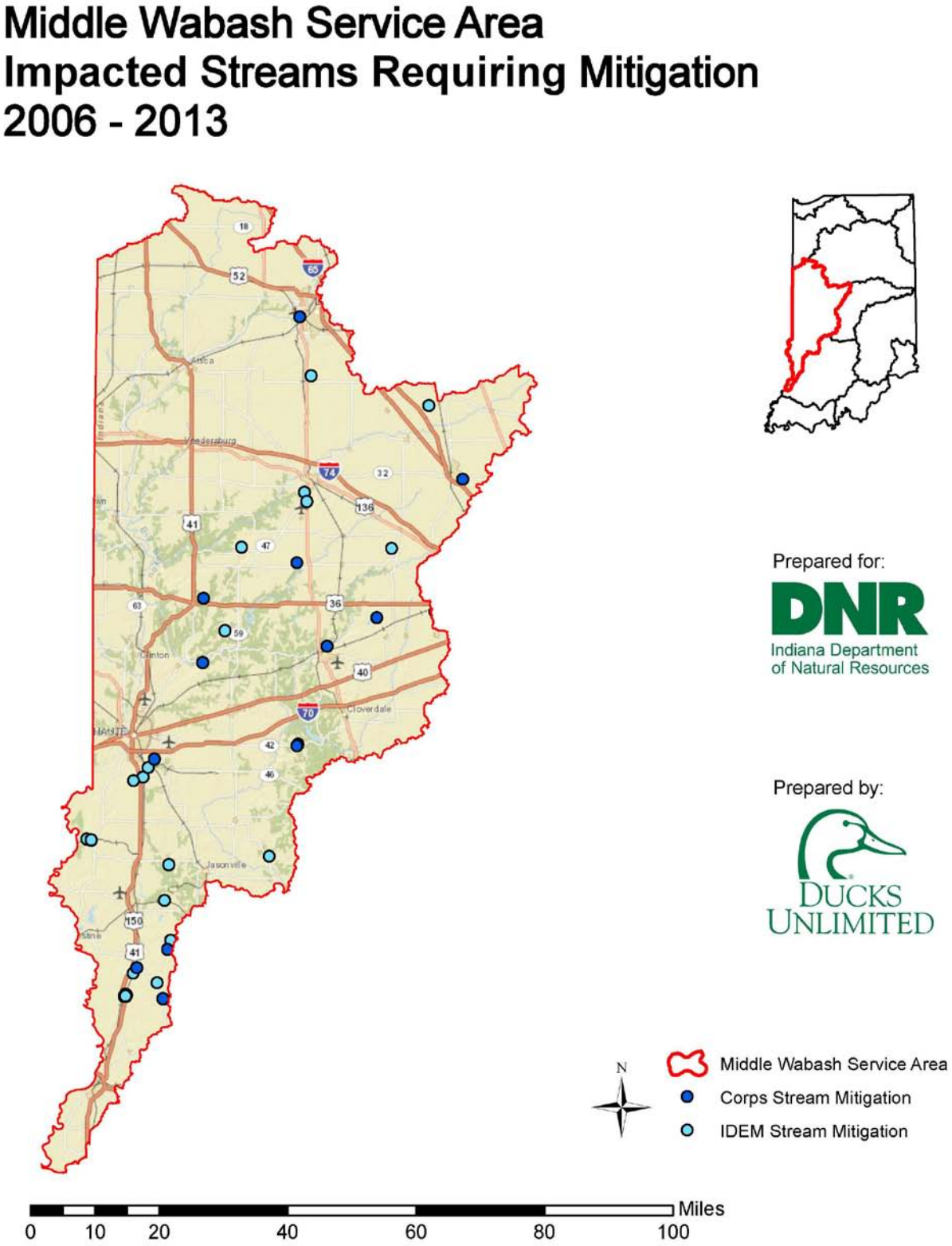


Figure 16. Impacted Streams Requiring Mitigation in the Middle Wabash Service Area (2006-2013)

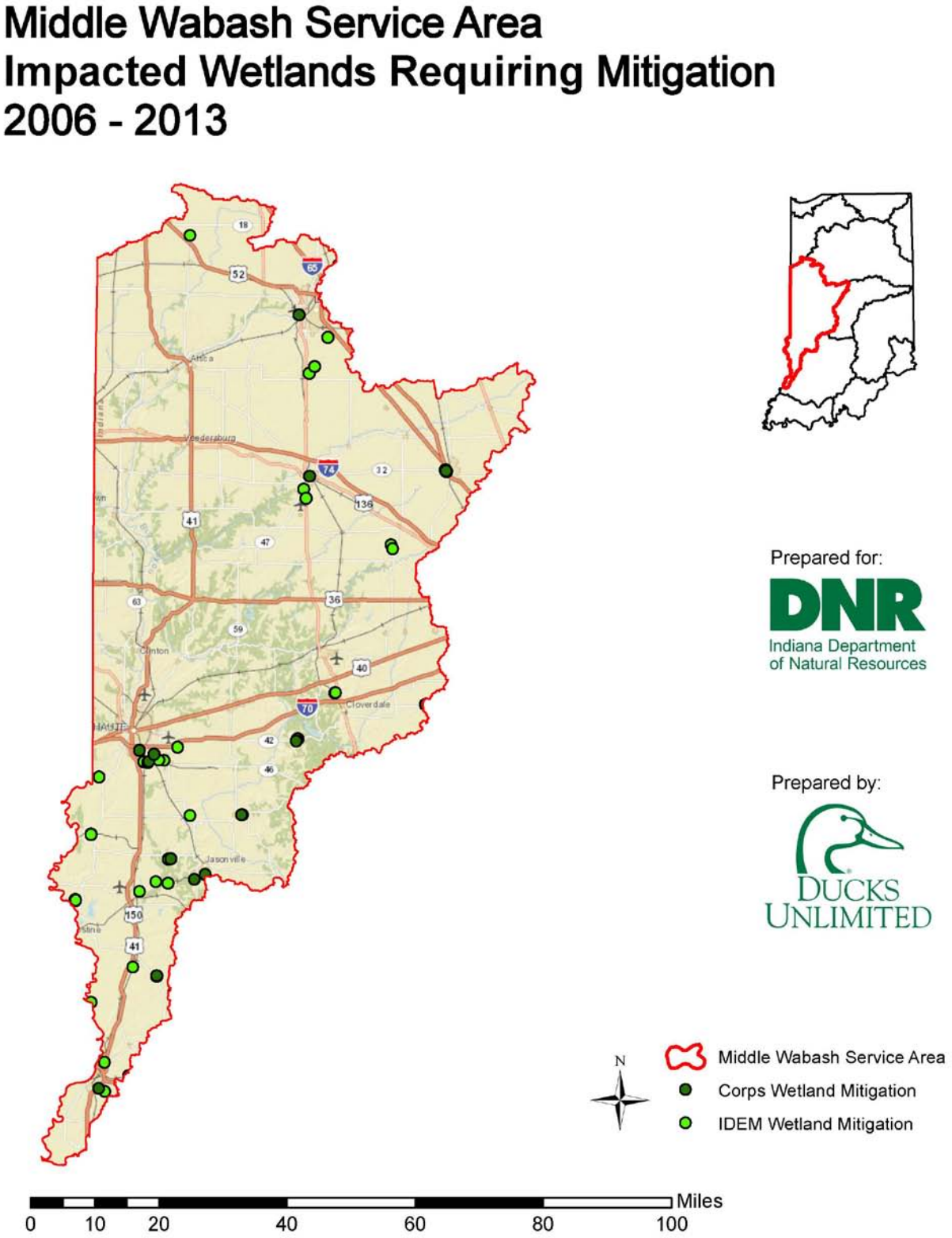


Figure 17. Impacted Wetlands Requiring Mitigation in the Middle Wabash Service Area (2006-2013)

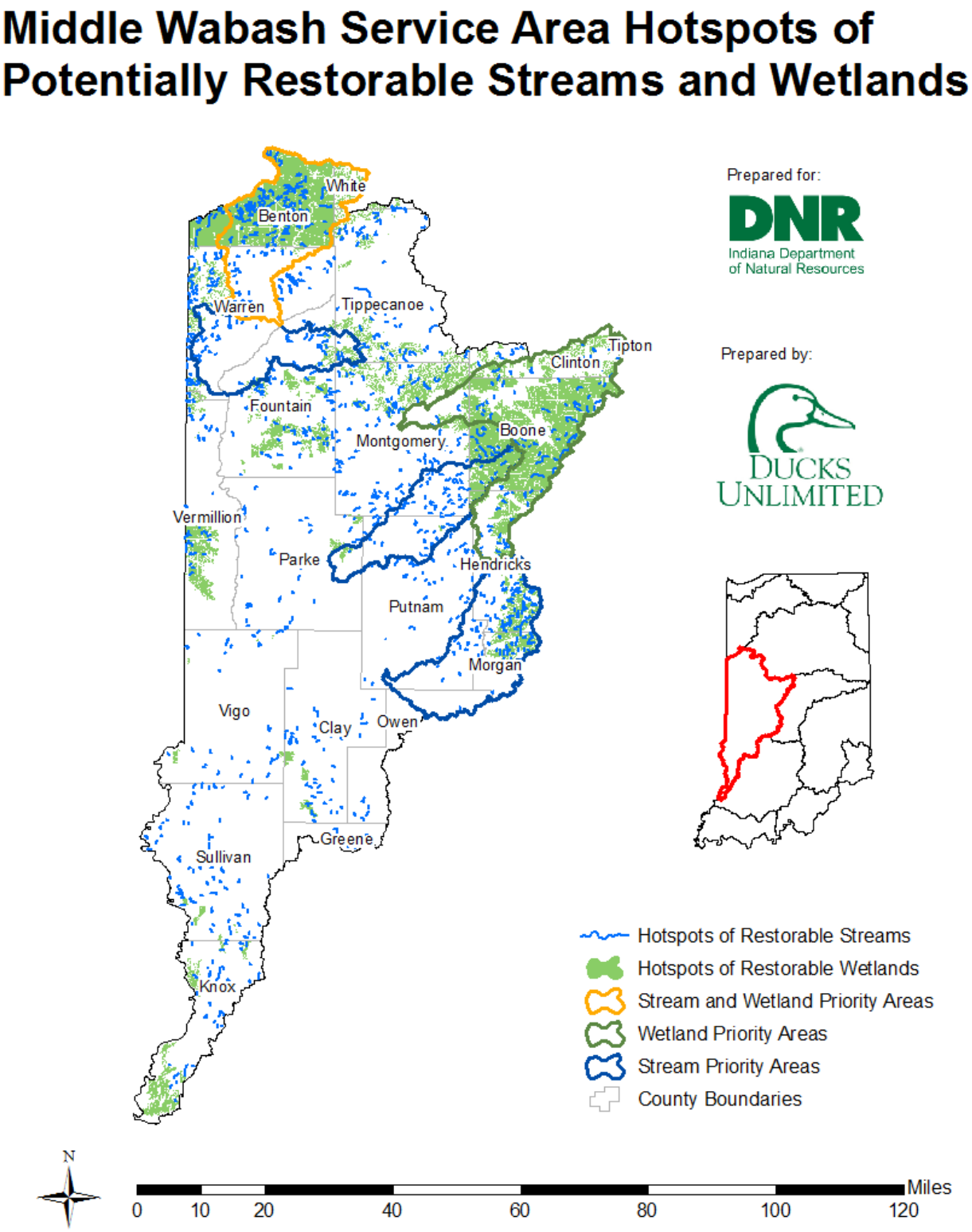


Figure 18. Hotspots of Potentially Restorable Streams and Wetlands in the Middle Wabash Service Area

HUC 10 Code	HUC 10 Name	Hotspots of Potentially Restorable Wetlands (acres)
0512010804	Big Pine Creek	85,687
0512011001	Browns Wonder Creek-Sugar Creek	63,715
0512011004	Prairie Creek-Sugar Creek	48,015
0512020301	East Fork Big Walnut Creek	41,872
0512010803	Mud Pine Creek	37,146

Table 14: Watersheds in the Middle Wabash Service Area with the most hotspots of potentially restorable wetlands

HUC 10 Code	HUC 10 Name	Hotspots of Potentially Restorable Streams (linear feet)
0512020305	Mill Creek	413,424
0512010804	Big Pine Creek	366,432
0512010812	Cecil M. Harden Lake-Big Raccoon Creek	257,136
0512010803	Mud Pine Creek	230,736
0512011006	Big Shawnee Creek-Wabash River	194,832

Table 15: Watersheds in the Middle Wabash Service Area with the most hotspots of potentially restorable streams

9.7 UPPER WHITE SERVICE AREA

A. Service Area Description

The Upper White Service Area is located in central Indiana and is composed of the following 8-digit HUC watershed:

- **05120201 - Upper White**

The Upper White Service Area includes all or portions of sixteen Indiana counties listed below and is located primarily within the Central Till Plain physiographic region; the entirety of the Upper White Watershed is within Indiana.

Madison	Johnson	Hendricks
Delaware	Morgan	Boone
Randolph	Brown	Hamilton
Henry	Monroe	Tipton
Hancock	Owen	Clinton
Marion		

The Upper White Service Area has a drainage area of approximately 2,720 square miles within Indiana and includes over 2,180 miles of streams (Tedesco, Hoffmann, Bihl, Hall, Barr, & Stouder, 2011). The majority of the service area is located in the Eastern Corn Belt Plains ecoregion and Central Till Plain natural region. The till plains are the most extremely farmed regions within the watershed consisting of generally impervious soils; these surfaces limit infiltration and promote surface runoff. The remainder of the watershed lies within the Interior Plateau ecoregion and the Highland Rim natural region; these areas tend to have poorly drained soils and are characterized by both hills and valleys in addition to a karst region in the southwestern most portion of the watershed (Ecoregions of Indiana: U.S. EPA).

Within the Upper White Service Area flows the West Fork of the White River and its numerous tributaries. Originating in Randolph County and traveling westward through the watershed, the West Fork of the White River passes through the state's capitol of Indianapolis. The river continues to travel southwest through Morgan County until it converges with the East Fork of the White River. From here, the White River travels southwest until joining the Wabash River at the Indiana/Illinois state border; the Wabash River confluences with the Ohio River and eventually drains to the Mississippi River.

A majority of the Upper White Service Area is dominated by agriculture (53.6%) and is most prominent in the northern and northeastern portions of the watershed. Moving toward the middle of service area into Indianapolis, the dominant cover type transitions from agriculture to developed land. Developed land accounts for 25.7% of the total land cover within the Upper White Service Area (Fry, et al., 2011). The major cover types of the southernmost section of the watershed are grasslands and deciduous forest.

B. Resource Status (*historic impacts, current conditions, and threats*)

Due to its highly urbanized central area and intersection of multiple highways, the Upper White Service Area has been subjected to vast amounts of wetland impacts as compared to a majority of the service areas. The bulk of these impacts were located in and around the state's greatest populated city and capitol, Indianapolis, and along its numerous, adjacent highways; these impacts have impaired a large portion of the aquatic systems within the service area.

Before the implementation of the Clean Water Act in the 1970s, point-source pollution of the White River and its tributaries came from sources such as waste-water treatment facilities, combined sewer outflows, and battery and transmission plants. Non-point sources of impairment to the waters of the Upper White Service Area included urban and agricultural runoff; a majority of these impairments still exist today. Stream banks within the service area have been eroded due to stream channelization, causing sedimentation; this has negatively impacted aquatic habitats as well as the natural flow regimes of streams (White River WMP, 2011).

According to the 2011 Upper White River Watershed Regional Watershed Assessment and Planning Report, agriculture, commonly found throughout headwaters of streams within the Upper White Service Area, has impacted streams due to nutrient loading; a recommended effort is the establishment of effective buffers. Urban areas within the service area have also impacted streams with organic pollutants due to combined sewer overflows and suspended sediment from erosion. Additional sources of impairments included failing septic systems, land use alterations, and road construction (Tedesco, Hoffmann, Bihl, Hall, Barr, & Stouder, 2011) .

More recently, IDEM reported E. coli, PCBs and mercury in fish tissue, and impaired biotic communities as causes of impairment to streams within the Upper White Service Area. Causes of impacts to freshwater lakes and reservoirs included algae, taste, and odor (Indiana Integrated Water Monitoring and Assessment Report to the U.S. EPA: IDEM, 2012). Wetlands in this service area have been lost due to agricultural conversion and urban development (Tedesco, Hoffmann, Bihl, Hall, Barr, & Stouder, 2011).

Total wetland acreage within the Upper White Service Area is approximately 60,254 acres, or 3.5% land cover of the service area; the most prominent wetland type within the service area is freshwater forested/shrub wetland, totaling 25,456 acres, or 1.5% total land cover within the service area. Wetland concentrations are greatest in Hamilton, Marion, and Morgan Counties.

Impact data from 2006-2013 in the Upper White Service Area were collected from the USACE and IDEM and analyzed. During this recent time period, 127 acres of impacted wetlands and 53,510 linear feet of impacted streams required mitigation according to the data from the USACE and 270 acres of impacted wetlands and 64,765 linear feet of stream required mitigation according to the data from IDEM.

C. Compensatory Mitigation Approach & Priorities

Habitat conversions by urbanization and agriculture are the primary sources of aquatic resource impairments in the Upper White Service Area. Wetland mitigation projects will focus on forested wetlands and emergent wetlands with buffers. Buffers around restored wetlands will help protect the wetlands from any negative impacts from existing and/or future urbanization. Stream mitigation projects will be focused on re-establishing plan and profile, floodplain connectivity, and riparian buffers on headwater streams.

Additional potential projects that will be investigated will be located along the main stem of the White River as well as areas adjacent to existing projects and/or land acquired as part of the White River Restoration following the Guide Corporation fish kill. Coordination with the Upper White River Watershed Alliance and attending their

meetings would provide benefits to the program by utilizing the most up to date watershed data and plans that exist within the service area.

Currently, the following land trusts exist within the service area: Mud-Creek Conservancy, Red-tail Conservancy, Sycamore Land Trust, and Central Indiana Land Trust. There is the potential for land trusts to dissolve, adjust their geographical boundaries, and for new land trust organizations to be created within the service area. IDNR will work with the land trusts that exist in the service area over the life of the program

Currently, the following watershed plans exist within the service area: Bacon Prairie Ditch WMP, Morse Reservoir/Cicero Creek WMP, Buck Creek WMP, Cool Creek WMP, Duck Creek WMP, Lilly & Little Duck Creek WMP, Eagle Creek WMP, Geist Reservoir Upper Fall Creek WMP, Indian Creek WMP, Little Cicero Creek WMP, Lower Fall Creek WMP, Lower White Lick Creek WMP, Muncie Creek-Hamilton Ditch and Truitt Ditch-White River WMP, Pleasant Run WMP, Stony Creek WMP, Swanfeld Ditch WMP, Upper White River (Delaware Co.) WMP, and WMP for the White River Watershed in North Central Morgan Co. (Lambs Creek WMP). However, IDNR will utilize the most current watershed planning information that is available as these plans are updated and/or new watershed plans are developed within this service area over the life of the program.

Hydric and partially hydric soils account for 1,018,050 acres, or 58.5% land cover, within the service area, out of which 678,635acres have the potential to be restored. This was determined by mapping current hydric and partially hydric soils data with potentially restorable land cover types (e.g., cropland, pasture) located within the service area. Hotspots account for 465,532 acres of these potentially restorable wetlands within the service area. Boone Pond Public Fishing Area is the only IDNR-managed land with adjacent hotspots of potentially restorable wetlands (1,433 acres). The watershed with the most hotspots of potentially restorable wetlands is Wiley Thompson Ditch-White Lick Creek (HUC 051202011302 [Table 16]). Approximately 4,123,680 linear feet of streams within the Upper White Service Area are located within 100 feet of agricultural fields; these linear feet of stream could provide opportunities for re-habilitation. Hotspots account for 1,420,320 linear feet of these potentially restorable streams within the service area. The watershed with the most hotspots of potentially restorable streams is Little Stone Creek-Stoney Creek (HUC 051202010107 [Table 17]). The watersheds with the most hotspots (Tables 16 & 17) are the basis for stream and wetland mitigation priority areas. This program will focus on re-establishing and/or rehabilitating 30 acres of forested and/or emergent wetland and 12,250 linear feet of perennial headwater streams within the priority areas of this service area. These goals are assuming the program will absorb 60% of the anticipated required mitigation within the first three years of the program.

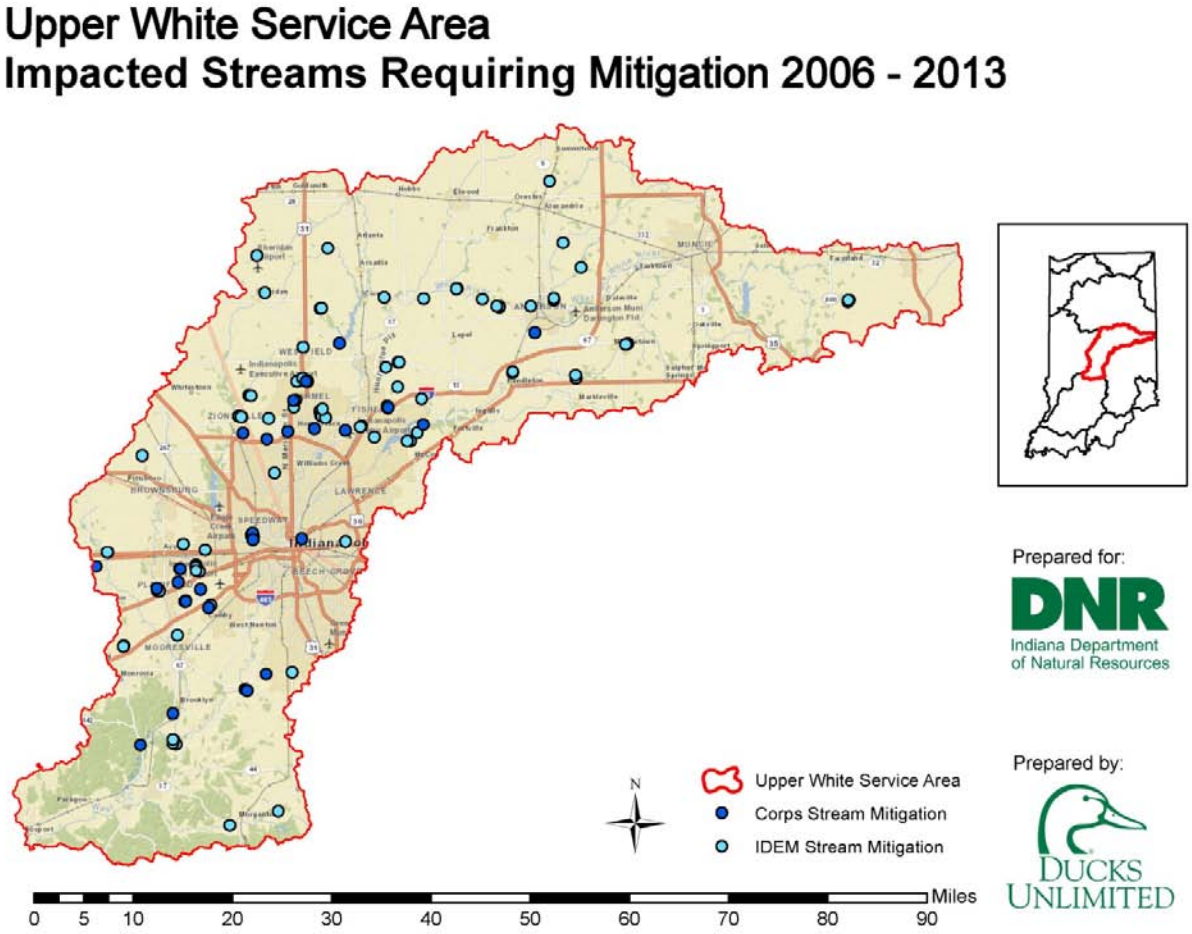


Figure 19. Impacted Streams Requiring Mitigation in the Lower White Service Area (2006-2013)

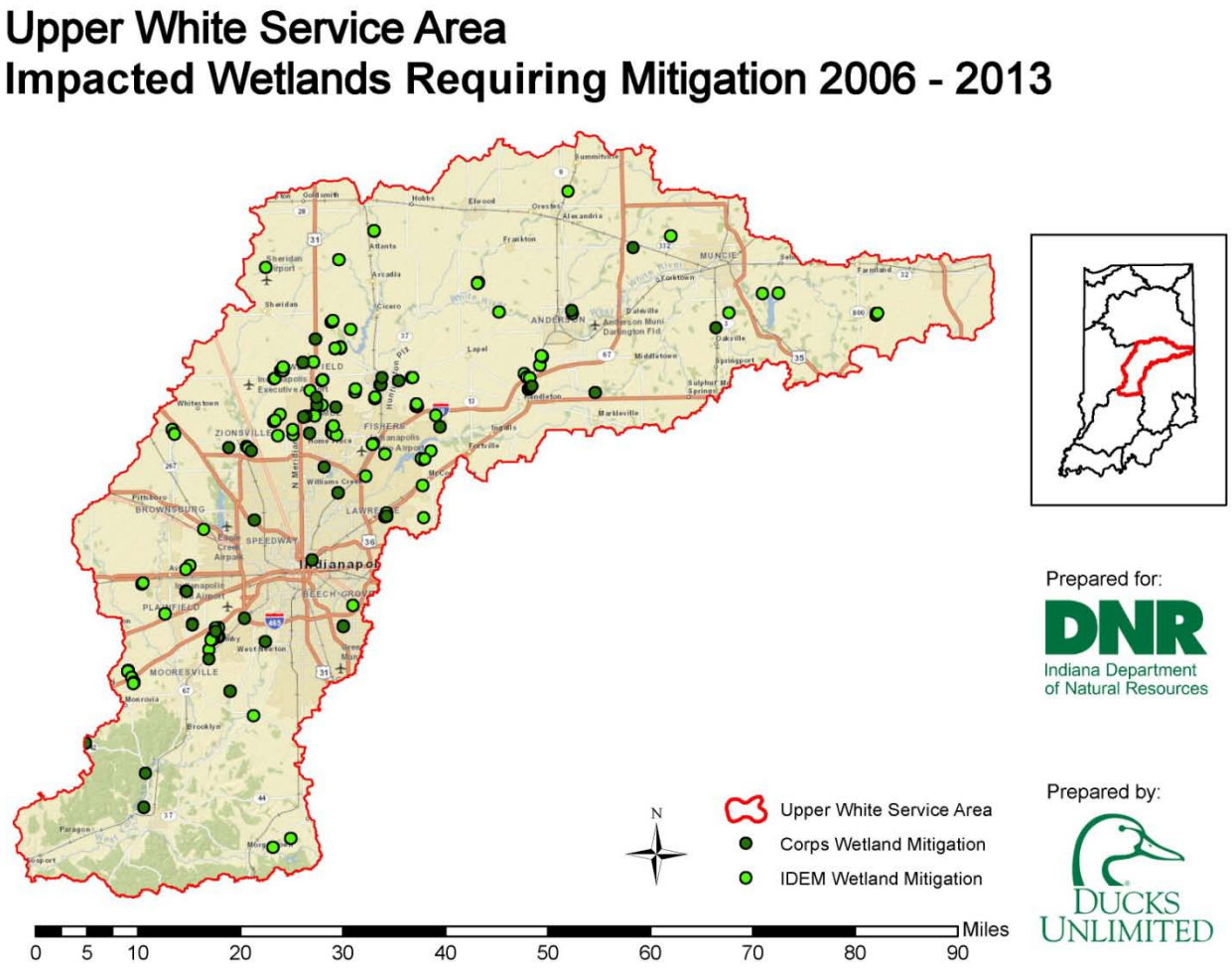


Figure 20. Impacted Wetlands Requiring Mitigation in the Lower White Service Area (2006-2013)

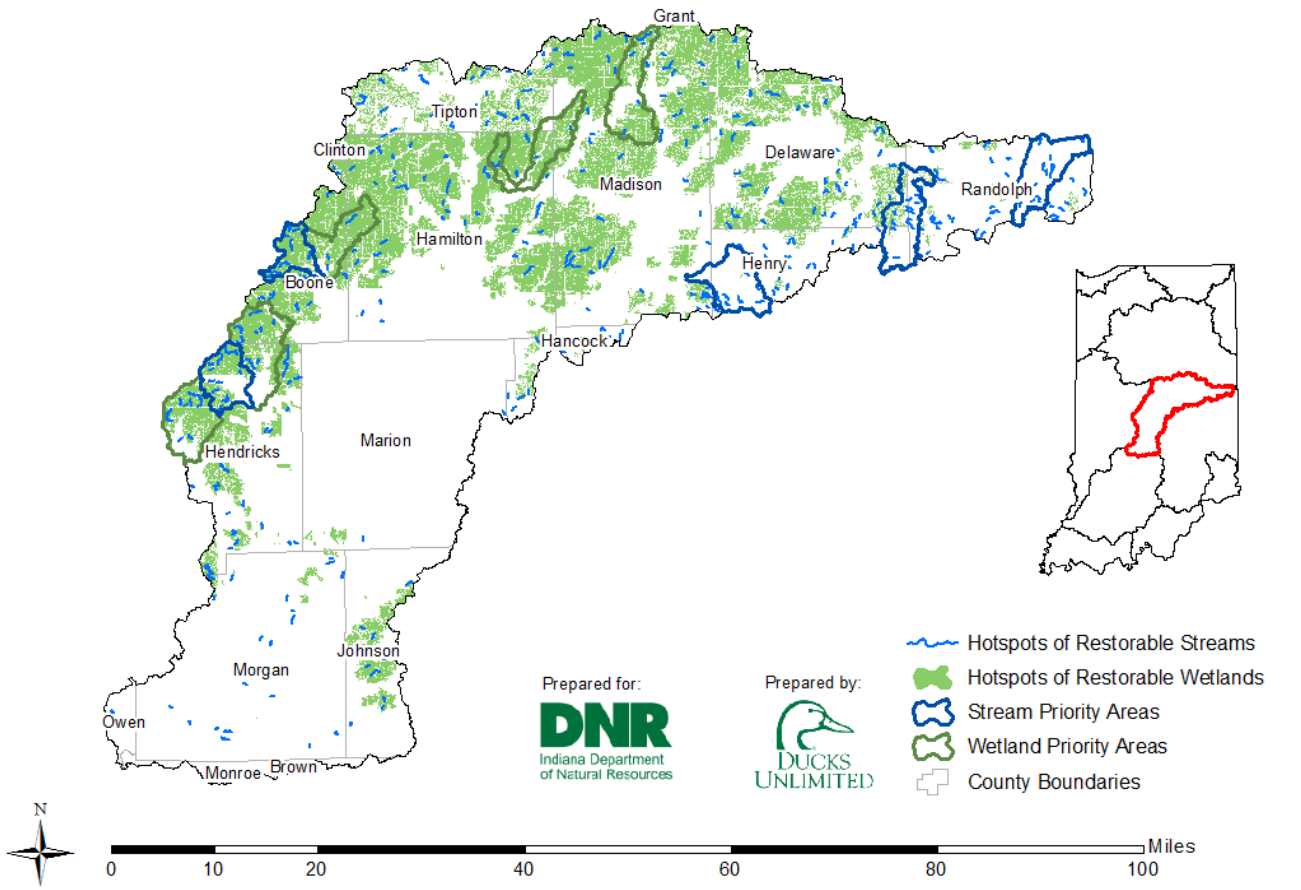


Figure 21. Hotspots of Potentially Restorable Streams and Wetlands in the Lower White Service Area

HUC 12 Code	HUC 12 Name	Hotspots of Potentially Restorable Wetlands (acres)
051202011302	Wiley Thompson Ditch-White Lick Creek	14,185
051202010405	Lilly Creek-Pipe Creek	12,310
051202010505	Lamberson Ditch-Duck Creek	12,157
051202011304	Headwaters West Fork White Lick Creek	11,661
051202011103	Finley Creek-Eagle Creek	11,343

Table 16: Watersheds in the Upper White Service Area with the most hotspots of potentially restorable wetlands

HUC 12 Code	HUC 12 Name	Hotspots of Potentially Restorable Streams (linear feet)
051202010107	Little Stone Creek-Stoney Creek	50,160
051202011301	Hughes Branch-West Fork White Lick Creek	49,104
051202010102	Peach Creek-White River	44,352
051202011102	Mounts Run	42,240
051202010803	Deer Creek-Fall Creek	41,712

Table 17: Watersheds in the Upper White Service Area with the most hotspots of potentially restorable streams

9.8 WHITEWATER-EAST FORK WHITE SERVICE AREA

A. Service Area Description

The Whitewater-East Fork White Service Area is located in southeastern Indiana and is composed of all or portions of the following seven 8-digit HUC watersheds:

- **05120204 - Driftwood**
- **05120205 - Flatrock-Haw**
- **05120206 - Upper East Fork White**
- **05120207 - Muscatatuck**
- **05080001 - Upper Great Miami**
- **05080003 - Whitewater**
- **05080002 - Lower Great Miami**

The Whitewater-East Fork White Service Area includes all or portions of twenty-three Indiana counties listed below and is located within the Central Till Plain and Southern Hills and Lowlands physiographic regions.

Madison	Rush	Brown
Randolph	Fayette	Jackson
Henry	Union	Jennings
Wayne	Franklin	Jefferson
Hancock	Dearborn	Scott
Marion	Ripley	Washington
Johnson	Decatur	Clark
Shelby	Bartholomew	

The Whitewater-East Fork White Service Area drains approximately 5,139 square miles of southeastern Indiana and is primarily located in the Eastern Corn Belt Plains ecoregion and its various sub-regions; these regions include the Loamy, High Lime Till Plains in the northwest, the Whitewater Interlobate Area in the northeast, and the Pre-Wisconsin Drift Plains in the south. Glaciers from the Wisconsin Stage over 50,000 years ago formed the northern portion of the Whitewater-East Fork White Service Area; the soils were developed from loamy, limy glacial deposits. The northeastern portion of the service area is defined by its coarse-bottomed streams fed by an abundance of groundwater and is where the Whitewater River flows. The southern portion of the Whitewater-East Fork White Service Area is characterized by acidic and extremely leached till and scattered sinkhole areas; prior to a majority of the land being converted to agriculture, beech forests and elm-ash swamp forests dominated the region. The remainder of the eastern portion of the Whitewater-East Fork White Service Area along the Indiana/Ohio border is part of the Interior Plateau ecoregion and Bluegrass natural region and is characterized by mosaic forests and its rugged terrain underlain by limestone and shale; this region has been extremely dissected by valleys and hills (Ecoregions of Indiana: U.S. EPA).

The Whitewater River is a significant river which flows through the Whitewater-East Fork White Service Area and is a main tributary of the Big Miami River of Ohio, draining into the Ohio River. The Whitewater River originates as two forks in Randolph and Wayne Counties in Indiana, flowing south toward Ohio and eventually converging in Franklin County; it is known for its steep gradient, falling at an average of six feet per mile (Whitewater River: IDNR).

The Whitewater-East Fork White Service Area is dominated by agriculture (56.9%) and deciduous forest (24.8%); woody wetlands and emergent herbaceous wetlands account for less than one percent in this service area (Fry, et al., 2011).

B. Resource Status (*historic impacts, current conditions, and threats*)

Throughout the 1900s, sedimentation and nutrient loading were main causes of impairments in the service area due to land-use conversion and stream-bank erosion. These impairments, as well as water contamination and pathogen transport from livestock stream access, significantly degraded aquatic habitats. Within the Whitewater River Basin of the service area, livestock with direct access to streams and rivers have caused stream-bank erosion and manure in the waterway can cause illnesses to humans and contributes to the impairments of these waters. In addition, agricultural runoff and failing septic systems carrying pollutants have drained into existing karst-area sinkholes, which have often been directly deposited into local water sources such as underground aquifers and streams (West Fork Watershed Steering Committee; Wayne County Soil and Water Conservation District, 2011).

More recently, IDEM reported E. coli, impaired biotic communities, dissolved oxygen, and PCBs and mercury in fish tissue as the main causes of impairments to streams within the Whitewater-East Fork White Service Area. Additional causes included free cyanide and nutrients. Algae, taste, and odor were reported causes of impairments to freshwater lakes and reservoirs within the service area (Indiana Integrated Water Monitoring and Assessment Report to the U.S. EPA: IDEM, 2012).

Total wetland acreage within the Whitewater-East Fork White Service Area is approximately 133,088 acres, or 4.0% land cover of the service area; the most prominent wetland type within the service area is freshwater forested/shrub wetland, totaling 90,190 acres, or 2.7% total land cover within the service area. Wetlands are most prominent in the southwest portion of the service area in Bartholomew, Jennings, Jefferson, Jackson and Scott Counties; land-use conversion is the main reason for the decline in Indiana's wetlands throughout history.

Impact data from 2006-2013 in the Whitewater-East Fork White Service Area were collected from the USACE and IDEM and analyzed. During this recent time period, 50 acres of impacted wetlands and 15,701 linear feet of impacted streams required mitigation according to the data from the USACE and 98 acres of impacted wetlands and 28,060 linear feet of impacted streams required mitigation according to the data from IDEM.

C. Compensatory Mitigation Approach & Priorities

Habitat conversion to agriculture is the primary cause of aquatic resource impairments in the Whitewater-East Fork White Service Area. Wetland mitigation projects will focus on wetlands surrounding karst features. Protection of groundwater seep wetlands and headwater wetlands will be a secondary priority in this service area.

Coordination with the IDNR Healthy Rivers Initiative (HRI) within the Muscatatuck Watershed (HUC-05120207) for possible stream and wetland mitigation projects will also be pursued. Stream mitigation projects will focus on headwater streams and associated wetlands in this service area. Stream projects will focus on re-establishing plan and profile, floodplain connectivity and riparian buffers.

Currently, the following land trusts exist within the service area: Three Valley Conservation Trust, Whitewater Valley Land Trust, Inc., Oak Heritage Conservancy, Indiana Karst Conservancy, Red-tail Conservancy, Sycamore Land Trust, and Central Indiana Land Trust. There is the potential for land trusts to dissolve, adjust their geographical boundaries, and for new land trust organizations to be created within the service area. IDNR will work with the land trusts that exist in the service area over the life of the program

Currently, the following watershed plans exist within the service area: Brandywine Creek WMP, Central Muscatatuck WMP, Clifty Creek WMP, Conns Creek WMP, Flatrock-Haw WMP, Garrison Creek WMP, Lick Creek WMP, Little Blue River WMP, Middle Fork-East Fork Whitewater WMP, Mud Creek WMP, Sand Creek WMP, Sugar Creek WMP, and Youngs Creek WMP. However, IDNR will utilize the most current watershed planning information that is available as these plans are updated and/or new watershed plans are developed within this service area over the life of the program.

Hydric and partially hydric soils account for 1,107,157 acres, or 33.7% land cover, within the service area, out of which 838,906 acres have the potential to be restored. This was determined by mapping current hydric and partially hydric soils data with potentially restorable land cover types (e.g., cropland, pasture) located within the service area. Hotspots account for 490,743 acres of these potentially restorable wetlands within the service area. Approximately 3,714 acres of hotspots of potentially restorable wetlands are adjacent to IDNR-managed lands. Atterbury Fish and Wildlife Area is the IDNR-managed land in the Whitewater-East Fork White Service Area with the most adjacent hotspots of potentially restorable wetlands (1,235 acres). The watershed with the most hotspots of potentially restorable wetlands is Clifty Creek (HUC 0512020601 [Table 18]). Approximately 11,816,640 linear feet of streams within the Whitewater-East Fork White Service Area are located within 100 feet of agricultural fields; these linear feet of stream could provide opportunities for re-habilitation. Hotspots account for 3,954,720 linear feet of these potentially restorable streams within the service area. Approximately 11,423 linear feet of hotspots of potentially restorable streams are adjacent to IDNR-managed lands. Austin Bottoms Conservation Area is the IDNR-managed land with the most hotspots of potentially restorable streams (8,046 linear feet). The watershed with the most hotspots of potentially restorable streams is Clifty Creek (HUC 0512020601 [Table 19]). The watersheds with the most hotspots (Tables 18 & 19) are the basis for stream and wetland mitigation priority areas. This program will focus on re-establishing and/or rehabilitating 15 acres of forested and emergent headwater wetlands and 3750 linear feet of perennial headwater streams within the priority areas of this service area. These goals are assuming the program will absorb 60% of the anticipated required mitigation within the first three years of the program.

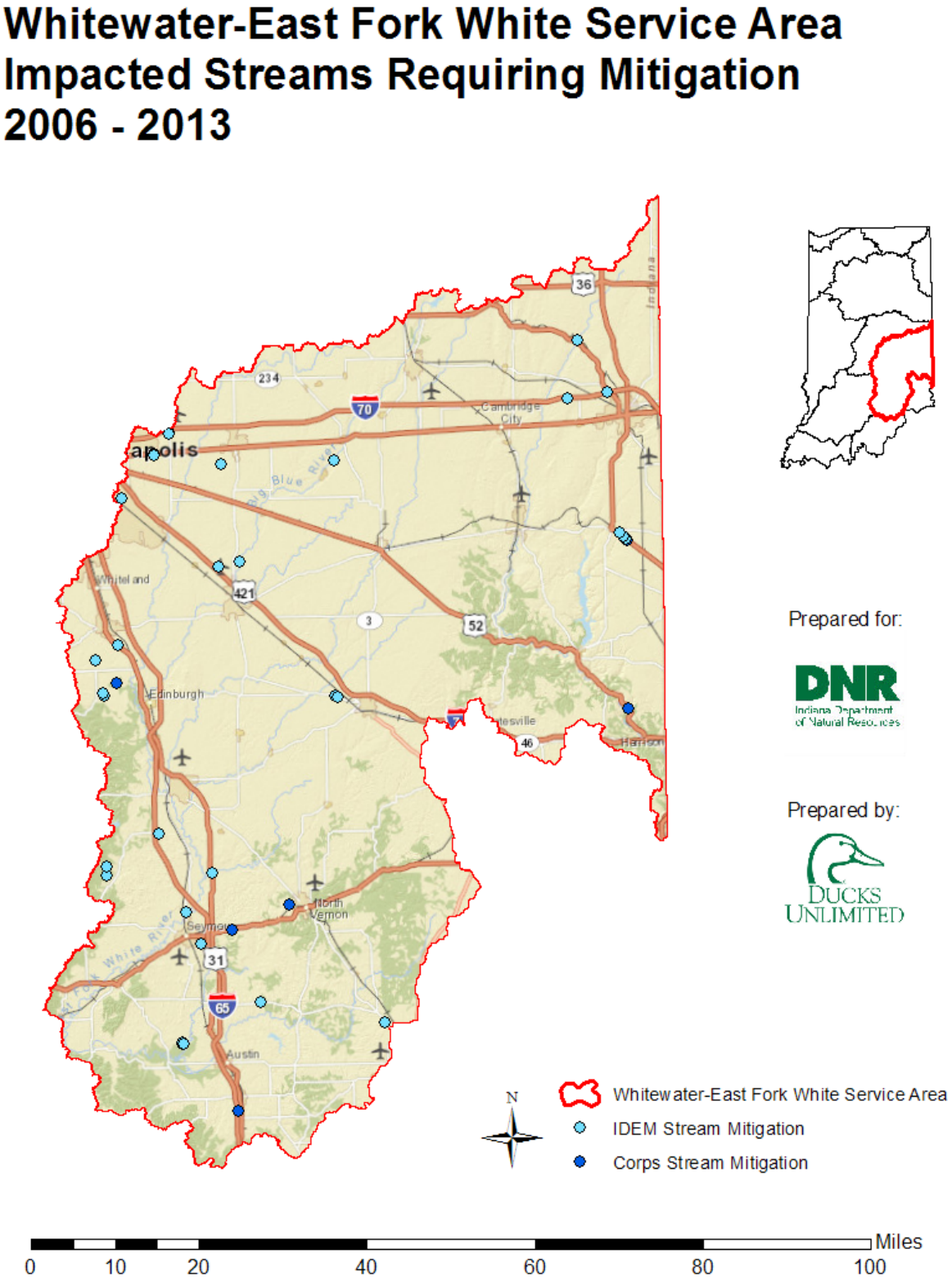


Figure 22. Impacted Streams Requiring Mitigation in the Whitewater-East Fork White Service Area (2006-2013)

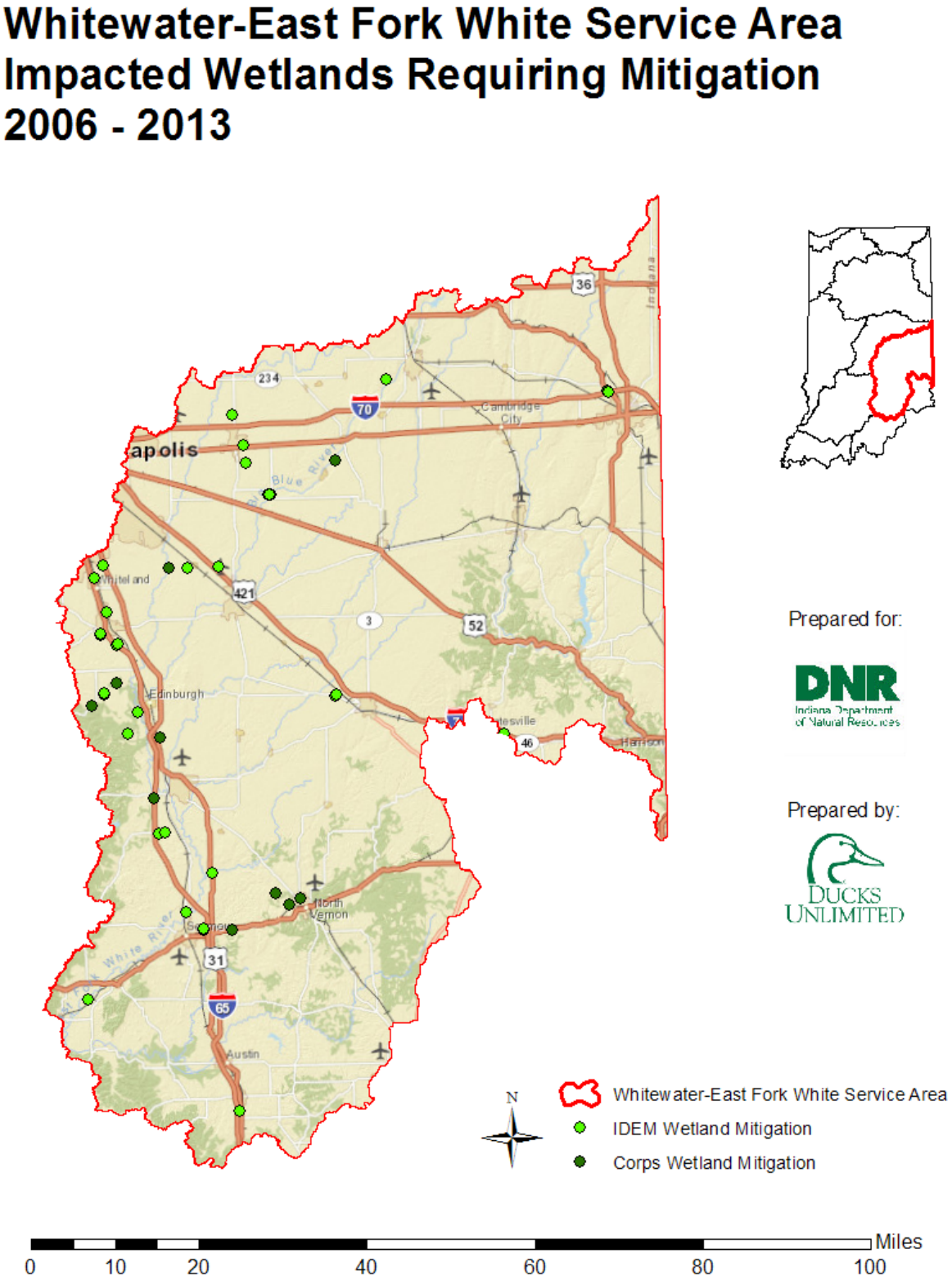


Figure 23. Impacted Wetlands Requiring Mitigation in the Whitewater-East Fork White Service Area (2006-2013)

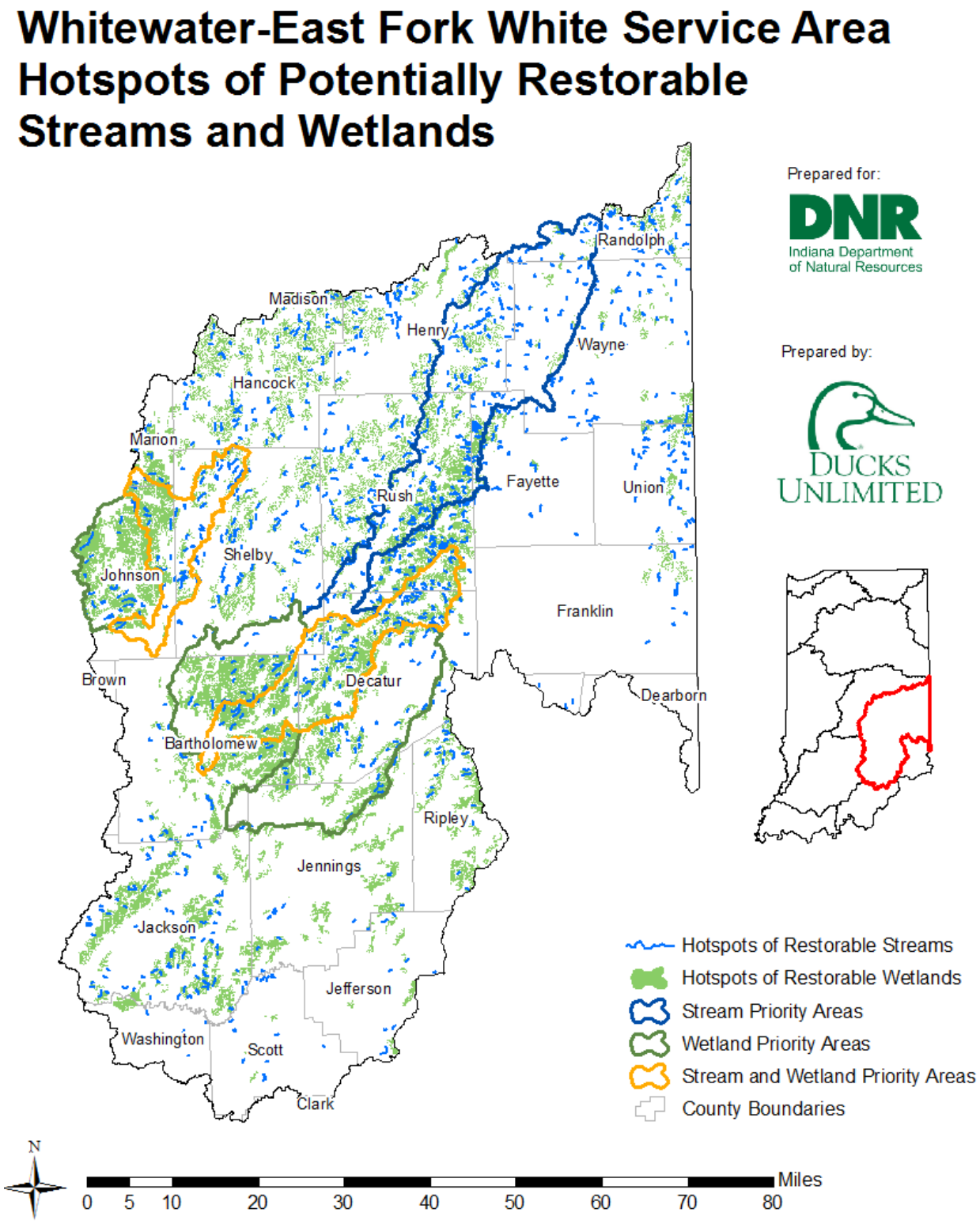


Figure 24. Hotspots of Potentially Restorable Streams and Wetlands in the Whitewater-East Fork White Service Area

HUC 10 Code	HUC 10 Name	Hotspots of Potentially Restorable Wetlands (acres)
0512020601	Clifty Creek	55,624
0512020406	Youngs Creek	36,271
0512020603	Sand Creek	34,735
0512020506	Flatrock River	29,143
0512020407	Sugar Creek	25,519

Table 18: Watersheds in the Whitewater-East Fork White Service Area with the most hotspots of potentially restorable wetlands

HUC 10 Code	HUC 10 Name	Hotspots of Potentially Restorable Streams (linear feet)
0512020601	Clifty Creek	356,928
0512020501	Shankatank Creek-Flatrock River	239,184
0512020301	Martindale Creek-Whitewater River	216,480
0508000407	Sugar Creek	215,952
0512020504	Mill Creek-Flatrock River	214,368

Table 19: Watersheds in the Whitewater-East Fork White Service Area with the most hotspots of potentially restorable streams

9.9 LOWER WHITE SERVICE AREA

A. Service Area Description

The Lower White Service Area is located in southeastern Indiana and is composed of the following three 8-digit HUC watersheds:

- **05120202 - Lower White**
- **05120208 - Lower East Fork White**
- **05120209 - Patoka**

The Lower White Service Area includes all or portions of nineteen Indiana counties listed below and is located within the Southern Hills and Lowlands physiographic region.

Owen	Lawrence	Gibson
Sullivan	Knox	Pike
Greene	Daviess	Dubois
Monroe	Martin	Crawford
Brown	Washington	Warrick
Bartholomew	Orange	Spencer
Jackson		

Draining approximately 4,564 square miles of Indiana, the Lower White Service Area is located in both the Interior Plateau and Interior River Valleys and Hills ecoregions. The eastern half of the service area (Interior Plateau) is characterized by karst topography, containing a concentration of sinkhole areas as well as sinking stream basins in the south. The easternmost part of the Lower White Service Area is mostly forested and is distinguished by its narrow valleys and dissected high hills with silt loam soils. Moving west, sink holes and underground drainage dominate the area, especially within the Lower White Watershed, and the majority of soil here is leached; this area transitions to a more rugged, wooded area moving toward the western half of the service area (Interior River Valleys and Hills) (Ecoregions of Indiana: U.S. EPA).

The western half of the service area is characterized by lowlands formed in sedimentary rock, and till deposits which are common north of the White River. Valleys are widespread within the region, and some of the most distinguishing features are the historical and active mines in the southwest (Ecoregions of Indiana: U.S. EPA). A number of large-scale wetland impacts have occurred near the surface mines in the Lower White Service Area bordering the Middle Wabash Service Area in addition to areas in the Patoka Watershed. Historically, a majority of mined land was abandoned without any restoration efforts; acid mine drainage degraded many aquatic systems in the past due to low pH to the point where the areas were devoid of local flora and fauna. The passing of the Surface Mining Control and Reclamation Act (SMCRA) by the United States government in 1977 has set strict reclamation rules for mining operations; the once degraded aquatic systems are now able to support aquatic life with their improved water quality (Watershed Management Plan: Lower Patoka River, 2008).

The Lower White Service Area contains many of Indiana's well-known aquatic systems including the White River (both the East Fork and West Fork), Monroe Lake, and the Patoka River. The East Fork of the White River enters the Lower White Service Area on the border of Washington and Jackson counties; both the East and West Forks of the White River travel southwest until their convergence at the Knox, Daviess, and Pike County borders; the White River joins with the Wabash River at the Indiana/Illinois border which eventually confluences with the Ohio River. Originating in the Hoosier National Forest, the Patoka River travels 138 miles westward and passes through one of Indiana's flood control reservoirs, Patoka Lake; the river confluences with the Wabash River in Gibson County. Formed from the forks of Salt Creek, Monroe Lake is Indiana's largest freshwater lake and is also one of Indiana's flood control reservoirs (Monroe Lake: U.S. Army Corps of Engineers, Louisville District).

The Lower White Service Area is dominated by deciduous forest (47%) and agriculture (30%); woody wetlands and emergent herbaceous wetlands account for less than one percent of the total land cover within the service area.

B. Resource Status (*historic impacts, current conditions, and threats*)

The Lower White Service Area contains both the East and West Forks of the White River; a significant amount of wetland impacts have occurred along the White River and its tributaries as well as numerous other areas scattered throughout the service area.

Throughout history, causes of impairments to water-bodies in the Lower White Service Area included sedimentation and nutrient loading; agriculture and urbanization were primary sources of nutrient-related impairments. Waste from farm animals and fertilizers from agricultural lands have both polluted ground and surface waters within the service area. Municipal industrial wastewater as well as overflows of combined sewers were often discharged directly into streams; this greatly and negatively impacted biota of streams (Martin, Crawford, Frey, & Hodgkins, 1996). Stream banks within the service area have also been eroded due to stream channelization by human alteration, causing sedimentation; this has negatively impacted aquatic habitats as well as the natural flow regimes of streams (White River WMP, 2011).

In addition to these historical impacts, acid mine drainage degraded many aquatic systems within the Lower White Service Area to the point where local fauna and flora could not survive; acid mine drainage heavily impacted aquatic resources caused by the seepage of highly acidic water and heavy metals to groundwater and surface water (IDNR Division of Reclamation, 2010).

More recently, IDEM reported the primary causes of impairments to the Lower White Service Area included E. coli, impaired biotic communities, PCBs and mercury in fish tissue, dissolved oxygen, and nutrients. Additional, but not prominent, causes of impairments included free cyanide, lead, mercury, sulfate, siltation, and pH. Common causes of impairments to freshwater lakes and reservoirs in this service area were taste, odor, and algae (Indiana Integrated Water Monitoring and Assessment Report to the U.S. EPA: IDEM, 2012).

A majority of IDNR-managed lands lie within the Lower White Service Area, more specifically near Monroe and Patoka Lakes and the Patoka and White Rivers. These lands provide valuable resources to wildlife and surrounding landscapes, for example, the Patoka National Wildlife Refuge was recognized as a focus area for waterfowl migration habitat. Objectives of the Upper Mississippi River & Great Lakes Region Joint Venture Implementation Plan drafted in 1998 for Indiana were to conserve acreage of breeding and migratory waterfowl habitat in addition to supporting annual duck breeding populations; the refuge provides some of the most productive wood duck nesting habitat in the state and is used by waterfowl during both fall and spring migration (Upper Mississippi River & Great Lakes Region Joint Venture, 1998).

Total wetland acreage within the Lower White Service Area is approximately 150,539 acres, or 5.2% land cover of the service area; the most prominent wetland type within the service area is freshwater forested/shrub wetland, totaling 70,084 acres, or 2.4% total land cover within the service area. Wetlands are greatest in the western portion of the service area in the Interior River Valleys and Hills ecoregion (The Status of Wetlands in Indiana: IDNR, 1996).

Impact data from 2006-2013 in the Lower White Service Area were collected from the USACE and IDEM and analyzed. During this recent time period, 148 acres of impacted wetlands and 132,467 linear feet of impacted streams required mitigation according to the data from the USACE and 144 acres of impacted wetlands and 91,767 linear feet of streams required mitigation according to the data from IDEM.

C. Compensatory Mitigation Approach & Priorities

Habitat conversion for agriculture is a common source of aquatic resource impairment in the Lower White Service Area. Wetland mitigation projects will focus on the White and Patoka River floodplains. Stream mitigation projects will focus on reconnecting streams to flood plains and re-establishing riparian buffers along the White and Patoka Rivers.

Since portions of the Lower White Service Area contain subterranean karst systems, an additional focus will be wetland and stream mitigation projects near surface openings to subterranean systems and preservation of karst stream tributaries.

Currently, the following land trusts exist within the service area: Ouabache Land Conservancy, Four Rivers RC&D, Oak Heritage Conservancy, Indiana Karst Conservancy, and Sycamore Land Trust. There is the potential for land trusts to dissolve, adjust their geographical boundaries, and for new land trust organizations to be created within the service area. IDNR will work with the land trusts that exist in the service area over the life of the program

Currently, the following watershed plans exist within the service area: Beanblossom Creek WMP, Kessinger Ditch WMP, Lost River WMP, Lower Patoka River WMP, Middle Patoka River Watershed Source Water Protection Plan, North Fork Salt Creek/Sweetwater Creek WMP, Owen County Watershed Initiative WMP, Patoka Lake Source Water Protection WMP, Patoka River (upper) WMP, Prairie Creek WMP, and Yellowwood Lake WMP. However, IDNR will utilize the most current watershed planning information that is available as these plans are updated and/or new watershed plans are developed within this service area over the life of the program.

Hydric and partially hydric soils account for 204,330 acres, or 7.0% land cover, within the service area, out of which 154,373acres have the potential to be restored. This was determined by mapping current hydric and partially hydric soils data with potentially restorable land cover types (e.g., cropland, pasture) located within the service area. Hotspots account for 90,655 acres of these potentially restorable wetlands within the service area. Approximately 5,459 acres of these hotspots of potentially restorable wetlands are on IDNR-managed lands within the Lower White Service Area. . Goose Pond Fish and Wildlife Area is the IDNR-managed land in the Lower White Service Area with the most adjacent hotspots of potentially restorable wetlands (3,141 acres). Other IDNR-managed lands in the Lower White Service Area with adjacent acres of hotspots of potentially restorable wetlands are White River Bend Wildlife Management Area and Greene-Sullivan State Forest. The watershed with the most hotspots of potentially restorable wetlands is Killion Canal-Prairie Creek HUC 051202020707 [Table 20]). Approximately 9,250,560 linear feet of streams within the Lower White Service Area are located within 100 feet of agricultural fields; these linear feet of stream could provide opportunities for re-habilitation. Hotspots account for 2,882,880 linear feet of these potentially restorable streams within the service area. Approximately 33,524 linear feet of hotspots of potentially restorable streams are adjacent to IDNR-managed lands. Goose Pond

Fish and Wildlife Area is the IDNR-managed land with the most adjacent hotspots of potentially restorable streams (19,644 linear feet).The watershed with the most hotspots of potentially restorable streams is Kane Ditch-Smothers Creek (HUC 051202020507 [Table 21]). The watersheds with the most hotspots (Tables 20 & 21) are the basis for stream and wetland mitigation priority areas. This program will focus on re-establishing and/or rehabilitating 35 acres of floodplain forested wetland and 20,750 linear feet of perennial streams within the priority areas of this service area. These goals are assuming the program will absorb 60% of the anticipated required mitigation within the first three years of the program.

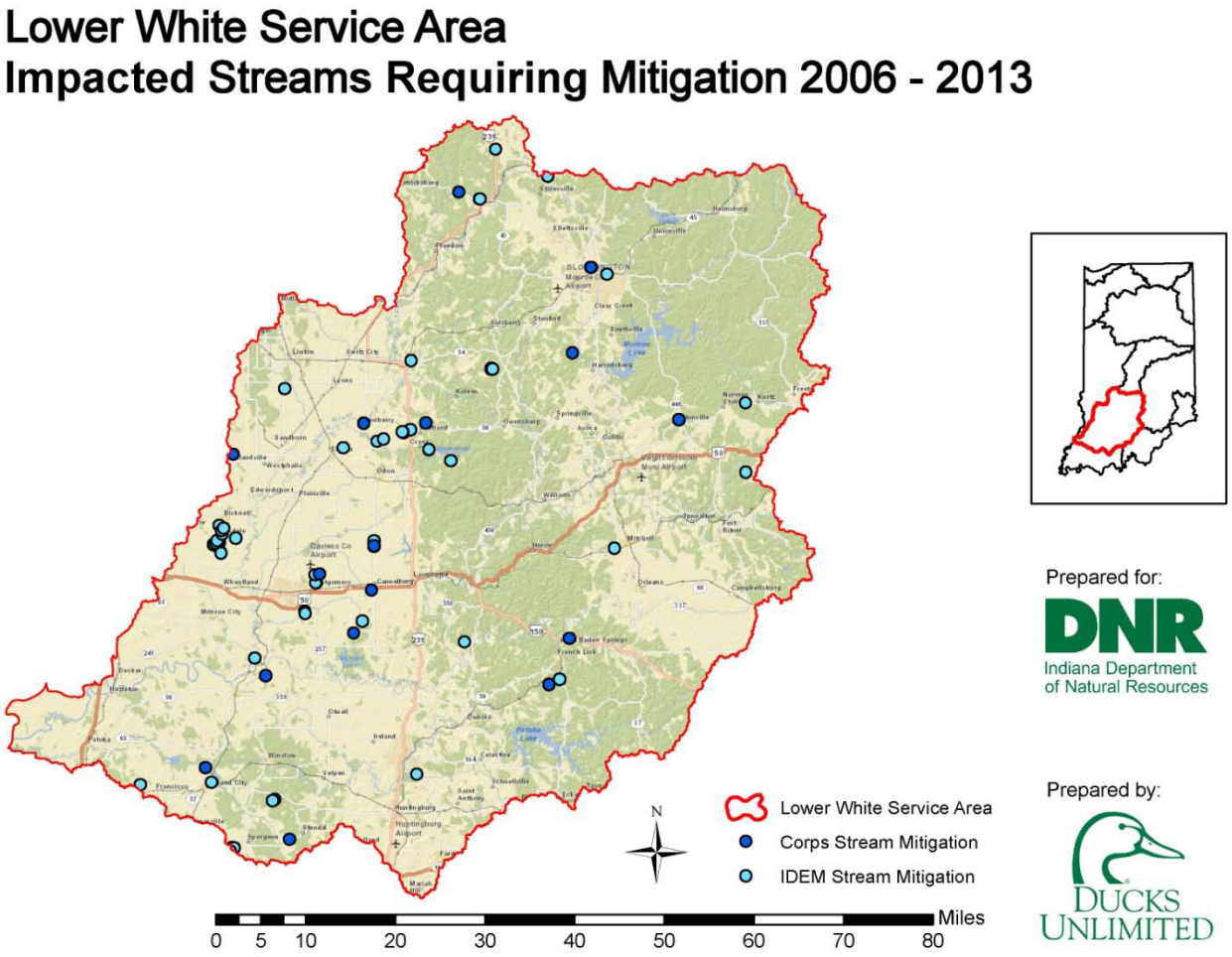


Figure 25. Impacted Streams Requiring Mitigation in the Lower White Service Area (2006-2013)

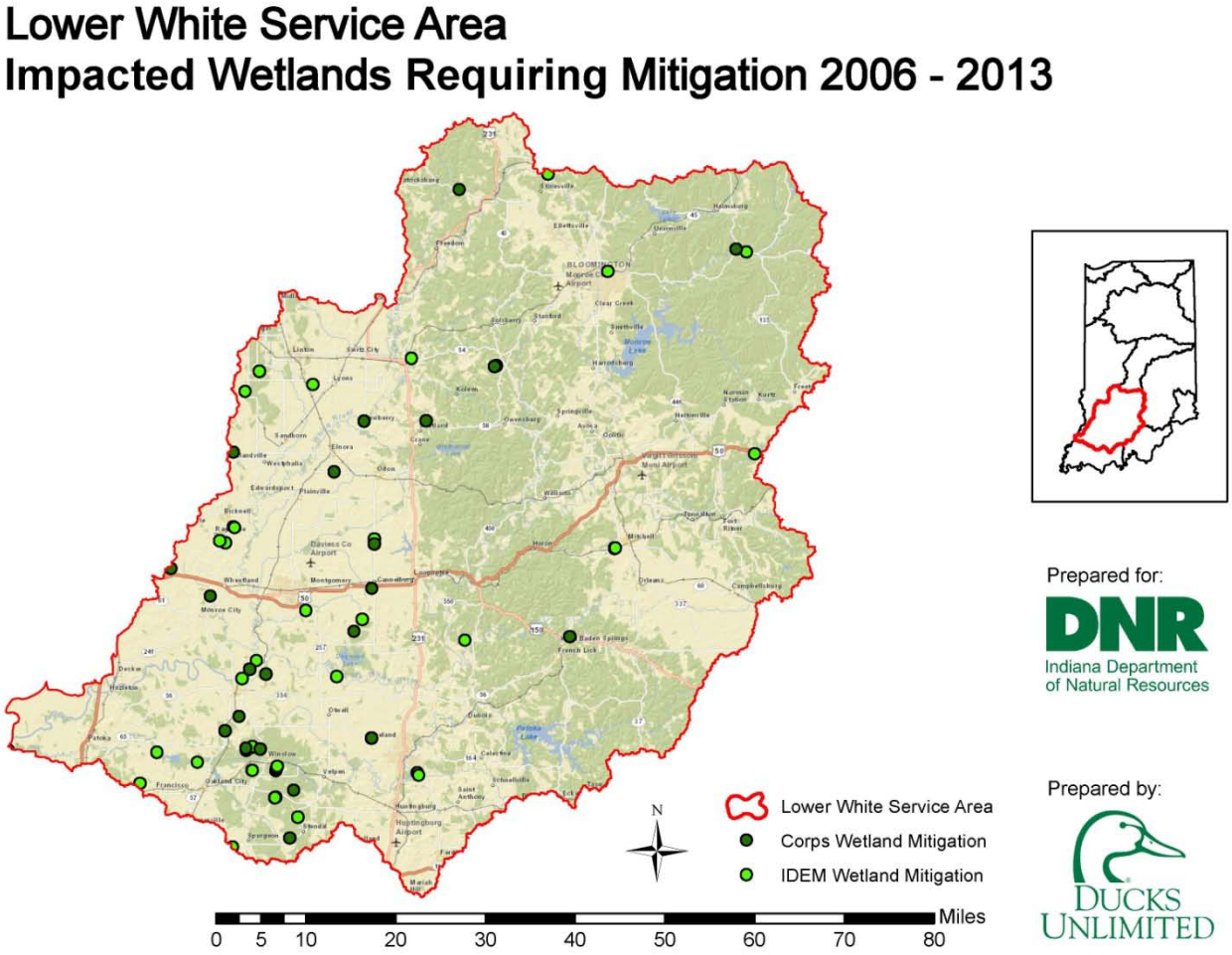


Figure 26. Impacted Wetlands Requiring Mitigation in the Lower White Service Area (2006-2013)

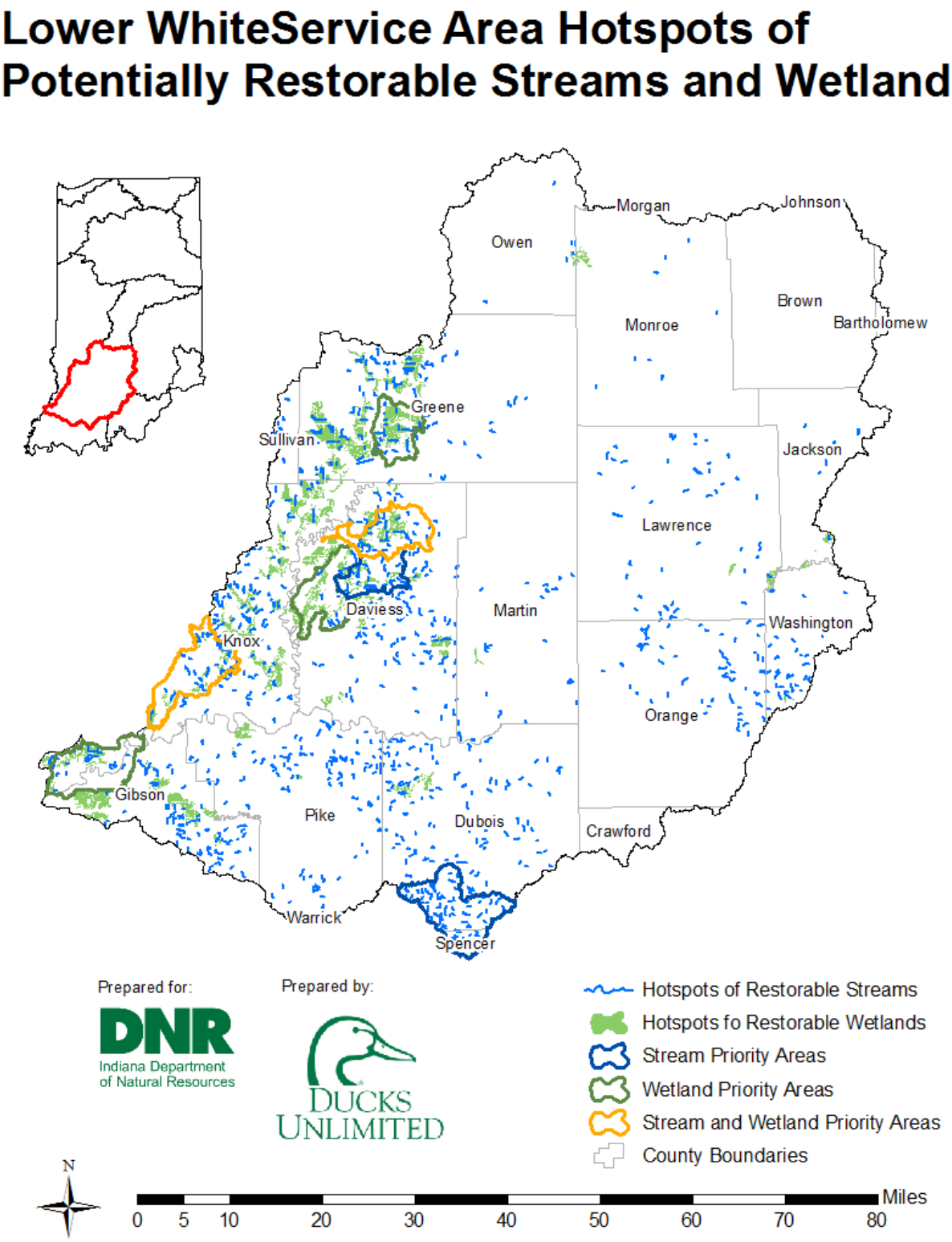


Figure 27. Hotspots of Potentially Restorable Streams and Wetlands in the Lower White Service Area

HUC 12 Code	HUC 12 Name	Hotspots of Potentially Restorable Wetlands (acres)
051202020707	Killion Canal-Prairie Creek	8,283
051202090505	Fourmile Creek	7,279
051202020507	Kane Ditch-Smothers Creek	6,960
051202021005	Upper River DeShee	5,806
051202021005	Claypole Pond-White River	5,732

Table 20: Watersheds in the Lower White Service Area with the most hotspots of potentially restorable wetlands

HUC 12 Code	HUC 12 Name	Hotspots of Potentially Restorable Streams (linear feet)
051202020507	Kane Ditch-Smothers Creek	159,456
051202021005	Upper River DeShee	155,232
051202020707	Killion Canal-Prairie Creek	121,968
051202090505	Bruner Creek	103,016
051202090302	Fourmile Creek	102,432

Table 21: Watersheds in the Lower White Service Area with the most hotspots of potentially restorable streams

9.10 UPPER OHIO SERVICE AREA

A. Service Area Description

The Upper Ohio Service Area is located in southern Indiana on the Indiana/Kentucky and Indiana/Ohio borders and is composed of the following three 8-digit HUC watersheds:

- **05140104 - Blue-Sinking**
- **05140101 - Silver-Little Kentucky**
- **05090203 - Middle Ohio-Laughery**

The Upper Ohio Service Area includes all or portions of fifteen Indiana counties listed below and is located within the Southern Hills and Lowlands physiographic region.

Perry	Jefferson	Ohio
Crawford	Ripley	Switzerland
Orange	Decatur	Clark
Washington	Franklin	Floyd
Scott	Dearborn	Harrison

The Upper Ohio Service Area drains approximately 2,374 square miles of southern Indiana and is located in both the Interior Plateau and Interior River Valleys and Hills ecoregions. Resting below the Lower White and Whitewater-East Fork White Service Areas, the southern border of the Upper Ohio Service Area is the Ohio River. The western portion of the service area is characterized by its rugged terrain and upland forest types; a majority of the area is thinly populated with minor areas of barren land and sandstone and limestone glades (Homoya, Abrell, Aldrich, & Post, 1985). The middle portion of the service area is part of the Southern Bottomlands natural region consisting of neutral to acidic silt loam soils. Bottomland forests, swamps and ponds make up a majority of the natural communities within this region. The remainder of the Upper Ohio Service Area is within the Bluegrass natural region, characterized by dissected plateaus underlain by limestone and shale (Hill).

The westernmost portion of the Upper Ohio Service Area and along its border with the Ohio-Wabash Lowlands Service Area contains a noticeable fraction of Indiana state and federally-owned lands. The Blue-Sinking Watershed, the westernmost watershed in the service area, also has the greatest karst region in the state and is denoted by its many sinkholes and caves (Hasenmueller, Powell, Buehler, & Sowder, 2011).

The Blue River is a popular river to the region originating in Washington County and traveling south to the Ohio River; it is part of the Indiana Natural, Scenic, and Recreational River System and is managed by the Blue River Commission (Blue River Commission). The river travels through one of the most scenic and diverse areas in the entire state of Indiana; features along the river include Indian sites, caves, and vast forests, to name a few. The

Blue River provides many ecological benefits to its aquatic community, including biodiversity and pristine habitat.

The Upper Ohio Service Area is dominated by deciduous forest (50%) and pasture/hay (21%), with only a small fraction being developed land (7%) of which a majority is open space (Wittman Hydro Planning Associates, Inc., 2002). Woody wetlands and emergent herbaceous wetlands account for less than one percent of the total land cover in the service area.

B. Resource Status (*historic impacts, current conditions, and threats*)

During the mid-1990s, streambank erosion and water pollution were general causes of impairments to service area; this was commonly the result of livestock access to streams. Additional impairments included land-use conversions and siltation caused by runoff from surrounding agricultural areas (IDNR Division of Outdoor Recreation, 1974). Agricultural runoff containing pollutants have drained into existing karst-area sinkholes within the service area; groundwater in this region is easily contaminated due to connectivity with surface waters via sinkholes and the karst topography. Impairments to wetlands and streams of the service area were commonly the result of land-use changes such as the conversion of forests to urban and agricultural lands.

More recently, IDEM identified the primary causes of impairments to the Upper Ohio Service Area's streams as E. coli, impaired biotic communities, dissolved oxygen, and PCBs and mercury in fish tissue. Additional causes included free cyanide and nutrients. Common causes of impairments to freshwater lakes within the service area included algae, taste, and odor (Indiana Integrated Water Monitoring and Assessment Report to the U.S. EPA: IDEM, 2012).

Total wetland acreage within the Upper Ohio Service Area is approximately 38,120 acres, or 2.2% land cover of the service area; the most prominent wetland type within the service area is freshwater forested/shrub wetland, totaling 12,684 acres, or 0.7% total land cover within the service area. Wetlands are more commonly found in Jefferson and Ohio Counties; wetland impacts have primarily occurred in Floyd and Clark Counties along their border of the Ohio River.

Impact data from 2006-2013 in the Upper Ohio Service Area were collected from the USACE and IDEM and analyzed. During this recent time period, 50 acres of impacted wetlands and 19,358 linear feet of impacted streams required mitigation according to the data from the USACE and 57 acres of impacted wetlands and 27,723 linear feet of streams required mitigation according to the data from IDEM.

C. Compensatory Mitigation Approach & Priorities

Habitat conversion and sedimentation are common causes of aquatic resource impairments in the Upper Ohio Service Area. Wetland mitigation projects will focus on emergent wetlands in the higher elevations of the service area where possible. An additional focus will be forested wetlands and oxbows along the Ohio River floodplain. Stream mitigation projects will focus on floodplain connectivity in the upper reaches of streams. Re-establishing floodplain connectivity and riparian buffers along the Ohio River will be an additional focus.

Since the western border of the Upper Ohio Service Area contains subterranean karst systems, an additional focus of stream and wetland mitigation projects in this service area will be wetlands and streams near surface openings to subterranean systems and preservation of karst stream tributaries. An additional focus will be impaired stream segments of the Blue River watershed.

Currently, the following land trusts exist within the service area: Oak Heritage Conservancy, Indiana Karst Conservancy, George Rogers Clark Land Trust, Oxbow, Inc., and Sycamore Land Trust. There is the potential for

land trusts to dissolve, adjust their geographical boundaries, and for new land trust organizations to be created within the service area. IDNR will work with the land trusts that exist in the service area over the life of the program

Currently, the following watershed plans exist within the service area: Hogan Creek WMP, Indian Creek WMP, Silver Creek WMP, South Laughery Creek WMP, and Tanners Creek WMP. However, IDNR will utilize the most current watershed planning information that is available as these plans are updated and/or new watershed plans are developed within this service area over the life of the program.

Hydric and partially hydric soils account for 82,260 acres, or 4.7% land cover, within the service area, out of which 52,007 acres have the potential to be restored. This was determined by mapping current hydric and partially hydric soils data with potentially restorable land cover types (e.g., cropland, pasture) located within the service area. Hotspots account for 25,328 acres of these potentially restorable wetlands within the service area. Versailles State Park is the IDNR-managed land with the most adjacent hotspots of potentially restorable wetlands within the Upper Ohio Service Area (551 acres). The watershed with the most hotspots of potentially restorable wetlands is Rogers Run-Fourteen Mile Creek (HUC 051401010403 [Table 22]). Approximately 3,558,720 linear feet of streams within the Upper Ohio Service Area are located within 100 feet of agricultural fields; these linear feet of stream could provide opportunities for re-habilitation. Hotspots account for 1,098,240 linear feet of these potentially restorable streams within the service area. Approximately 1,304 linear feet of hotspots of potentially restorable streams are on IDNR-managed lands. Approximately 4,047 linear feet of hotspots of potentially restorable streams are adjacent to IDNR-managed lands. Harrison-Crawford State Forest is the IDNR-managed land with the most adjacent hotspots of potentially restorable streams (2,266 linear feet). The watershed with the most hotspots of potentially restorable streams is Highland Creek-West Fork Blue River (HUC 051401040703 [Table 23]). The watersheds with the most hotspots (Tables 22 & 23) are the basis for stream and wetland mitigation priority areas. This program will focus on re-establishing and/or rehabilitating 15 acres of emergent wetland and 4,500 linear feet of perennial tributary streams. These goals are assuming the program will absorb 60% of the anticipated required mitigation within the first three years of the program.

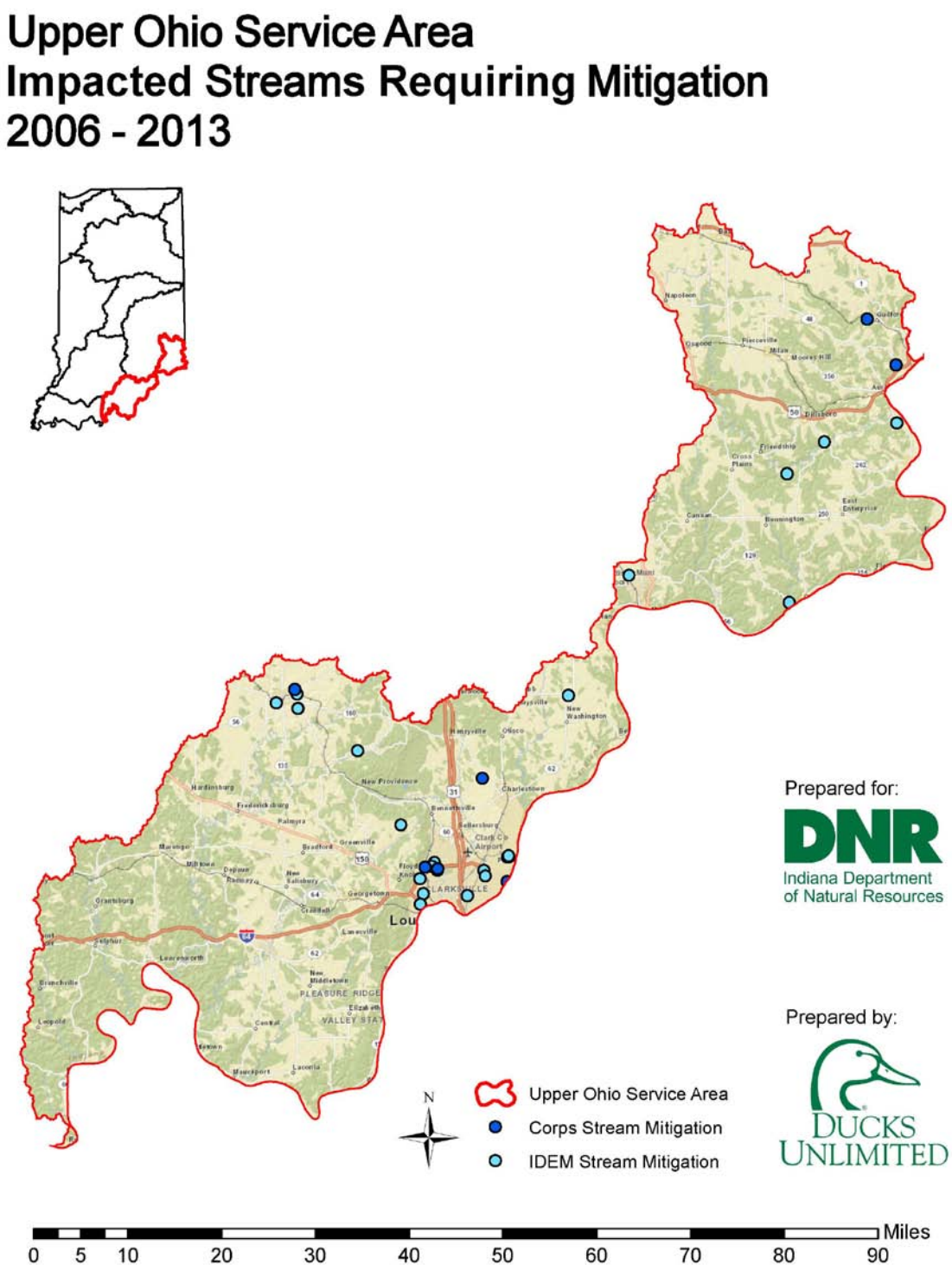


Figure 28. Impacted Streams Requiring Mitigation in the Upper Ohio Service Area (2006-2013)

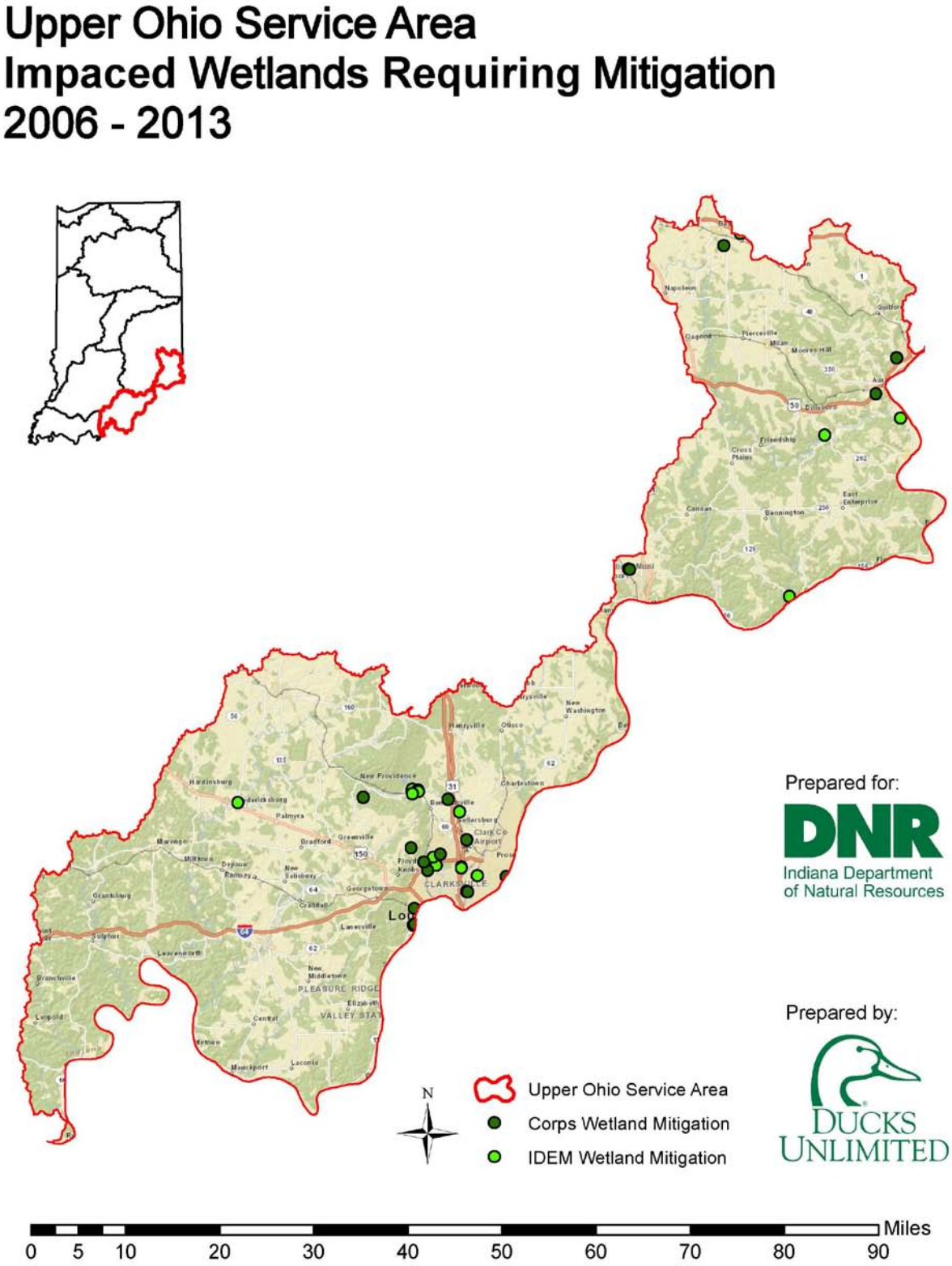


Figure 29. Impacted Wetlands Requiring Mitigation in the Upper Ohio Service Area (2006-2013)

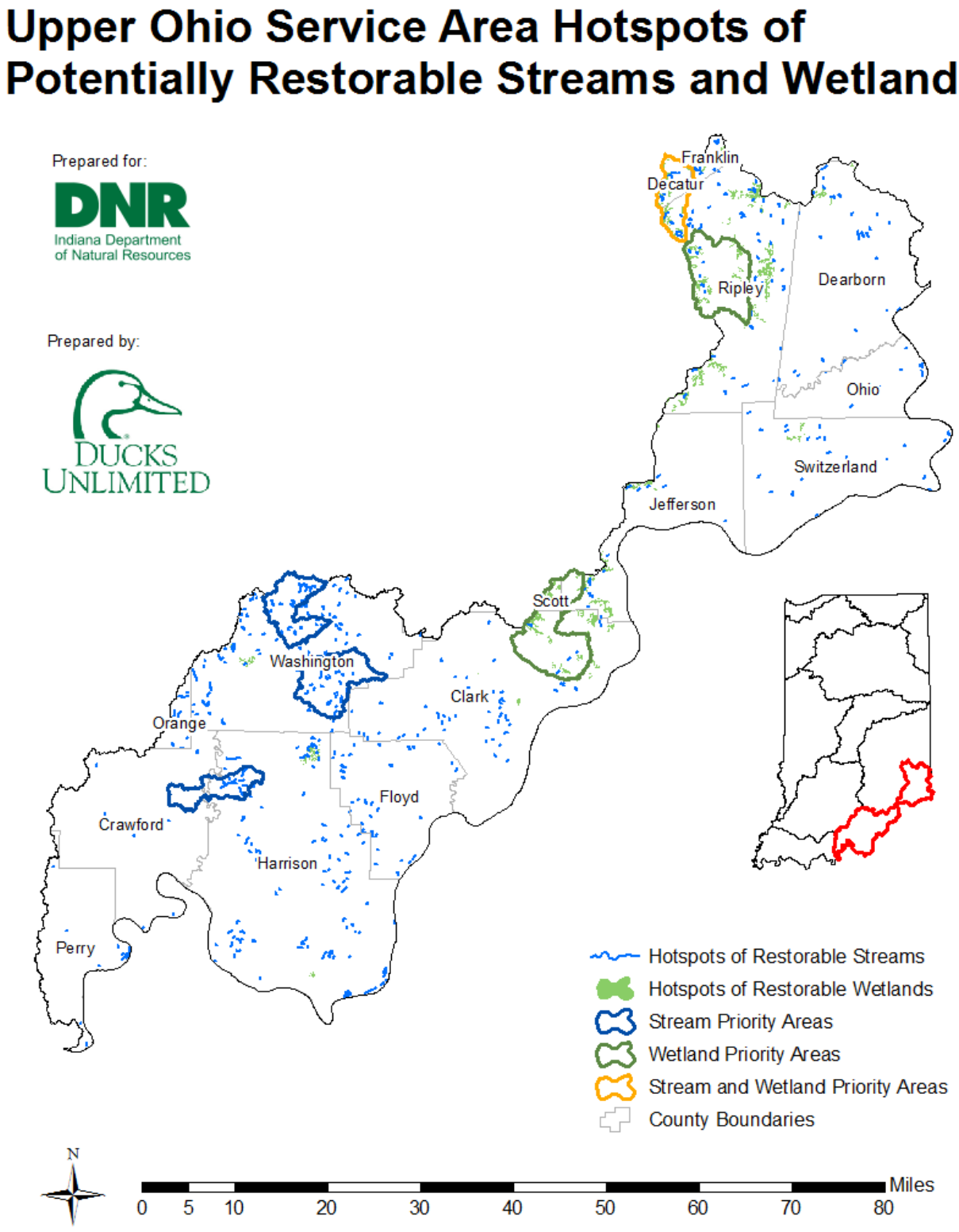


Figure 30. Hotspots of Potentially Restorable Streams and Wetlands in the Upper Ohio Service Area

HUC 12 Code	HUC 12 Name	Hotspots of Potentially Restorable Wetlands (acres)
051401010403	Rogers Run-Fourteen Mile Creek	4,513
050902030501	Tub Creek-Laughery Creek	4,193
050902030507	Henderson Bend-Laughery Creek	3,079
050902030506	Jericho Creek-Laughery Creek	2,573
051401010402	West Fork Fourteen Mile Creek	2,398

Table 22: Watersheds in the Upper Ohio Service Area with the most hotspots of potentially restorable wetlands

HUC 12 Code	HUC 12 Name	Hotspots of Potentially Restorable Streams (linear feet)
051401040703	Highland Creek-West Fork Blue River	62,832
051401040603	City of Pekin-South Fork Blue River	44,352
050902030501	Tub Creek-Laughery Creek	43,824
051401040604	Dutch Creek-South Fork Blue River	35,904
051401040901	Slick Run-Blue River	35,376

Table 23: Watersheds in the Upper Ohio Service Area with the most hotspots of potentially restorable streams

9.11 OHIO-WABASH LOWLANDS SERVICE AREA

A. Service Area Description

The Ohio-Wabash Lowlands Service Area is located in the most southwestern part of Indiana and is composed of all or portions of the following three 8-digit HUC watersheds:

- **05140202 - Highland-Pigeon**
- **05140201 - Lower Ohio-Little Pigeon**
- **05120113 - Lower Wabash**

The Ohio-Wabash Lowlands Service Area includes all or portions of nine Indiana counties listed below and is located within the Southern Hills and Lowlands physiographic region.

Gibson	Crawford	Warrick
Pike	Perry	Vanderburgh
Dubois	Spencer	Posey

The Ohio-Wabash Lowlands Service Area drains 2,101 square miles of southwestern Indiana and is located mainly in the Interior River Valleys and Hills, or Interior River Lowland ecoregion; it is bordered on three sides by the Patoka River, Wabash River, and Ohio River. Key features of this region include wide, shallow valleys with wind-blown silt deposits in the west and sandstone bedrock exposure in the east; the soils in this area are neutral to acidic. Prior to the area being cleared for agricultural use and surface mining, mesophytic and oak-hickory forests flourished (Ecoregions of Indiana: U.S. EPA).

A majority of state and federal lands within this service area are located in the easternmost portion of the service area, along its border with the Upper Ohio Service Area. Popular streams within this service area include Pigeon Creek, Little Pigeon Creek, and the Anderson River, all of which drain to the Ohio River.

Land use in the service area is mainly agricultural (48.9%) and deciduous forest (28.4%); woody wetlands and emergent herbaceous wetlands account for approximately two percent of the total land cover in the service area, while developed land cover is less than 10% (Fry, et al., 2011).

B. Resource Status (*historic impacts, current conditions, and threats*)

Historically, sedimentation and illegal discharges of residential wastewater to streams and ditches from straight pipe discharges have been common causes of impairments to aquatic systems in the area (Wittman Hydro Planning Associates, Inc., 2002). In addition, surface mining is most prominent in the Highland-Pigeon Watershed; underground mines also exist in the Lower Wabash Watershed within the service area. The Lower

Ohio-Little Pigeon Watershed (HUC-05140201) has few surface mines along its border with the Highland Pigeon Watershed; widespread strip mining within these watersheds and habitat alterations throughout the entire service area have both negatively impacted the water quality of the streams and rivers within these areas throughout the 1900s.

More recently, IDEM identified the primary causes of impairments to the Ohio-Wabash Lowlands Service Area's streams as impaired biotic communities, dissolved oxygen, E. coli, and PCBs and mercury in fish tissue. Additional causes included pH, ammonia, and pesticides. Common causes of impairments to freshwater lakes in the service area included algae, taste, and odor (Indiana Integrated Water Monitoring and Assessment Report to the U.S. EPA: IDEM, 2012).

Multiple areas of the Ohio-Wabash Lowlands Service Area were recognized as focus areas for migration habitat; these areas included the westernmost counties of the service area, Gibson and Posey counties, as well as the Little Pigeon Creek. Gibson Lake and its adjacent wetlands are heavily used during fall and spring migration by waterfowl and various shorebirds and wading birds. Posey County contains numerous oxbow lakes, broad lowlands, and bottomland hardwood forests which are utilized by wood ducks as nesting habitat and is greatly used by migrating waterfowl during spring and fall. Its close proximity to the Ohio River allows large areas of Posey County to be flooded during late winter and spring; these areas provide some of the most productive shorebird habitat in Indiana. The Little Pigeon Creek serves as a valuable nesting habitat for wood ducks and also as important migratory habitat for waterfowl (Upper Mississippi River & Great Lakes Region Joint Venture, 1998).

Total wetland acreage within the Ohio-Wabash Lowlands Service Area is approximately 101,805 acres, or 7.6% land cover of the service area; the most prominent wetland type within the service area is freshwater forested/shrub wetland, totaling 52,338 acres, or 3.9% total land cover within the service area. Wetland density is greatest in Posey, Gibson, and Warrick Counties; the easternmost part of the service area within Perry County contains the smallest amount of wetlands (The Status of Wetlands in Indiana: IDNR, 1996).

Impact data from 2006-2013 in the Ohio-Wabash Lowlands Service Area were collected from the USACE and IDEM and analyzed. During this recent time period, 56 acres of impacted wetlands and 42,717 linear feet of impacted streams required mitigation according to the data from the USACE and 136 acres of impacted wetlands and 34,032 linear feet of impacted streams required mitigation according to the data from IDEM.

C. Compensatory Mitigation Approach & Priorities

Habitat conversion and sedimentation are common causes of aquatic resource impairments in the Ohio-Wabash Lowlands Service Area. Wetland mitigation projects will focus on connectivity to existing habitats. Wetland projects will also be focused on bottomland forested wetlands along the Ohio River. Stream mitigation projects will focus on re-establishing floodplain connectivity and riparian buffers in streams near the confluence with the Ohio River.

Since portions of the Ohio-Wabash Lowlands Service Area contain subterranean karst systems, an additional focus of stream and wetland mitigation projects in this service area will be wetlands and streams near surface openings to subterranean systems and preservation of karst stream tributaries. Opportunities for mitigation projects in conjunction with efforts to improve water quality from acid mine drainage will also be explored, with the IDNR-Abandoned Mined Lands Program.

Currently, the following land trusts exist within the service area: Four River RC&D and Sycamore Land Trust. There is the potential for land trusts to dissolve, adjust their geographical boundaries, and for new land trust

organizations to be created within the service area. IDNR will work with the land trusts that exist in the service area over the life of the program

Currently, the following watershed plans exist within the service area: Big Creek WMP, Highland-Pigeon WMP, Pitcher Lake WMP, and Upper Anderson River WMP. However, IDNR will utilize the most current watershed planning information that is available as these plans are updated and/or new watershed plans are developed within this service area over the life of the program.

Hydric and partially hydric soils account for 182,310 acres, or 13.5% land cover, within the service area, out of which 132,589 acres have the potential to be restored. This was determined by mapping current hydric and partially hydric soils data with potentially restorable land cover types (e.g., cropland, pasture) located within the service area. Hotspots account for 73,466 acres of these potentially restorable wetlands within the service area. Approximately 1,478 acres of hotspots of potentially restorable wetlands are adjacent to IDNR-managed lands. Bluegrass Fish and Wildlife Area is the IDNR-managed land with the most adjacent hotspots of potentially restorable wetlands (1,056 acres).The watershed with the most hotspots of potentially restorable wetlands is Scott Ditch-Wabash River (HUC 051201130305 [Table 26]). Approximately 7,677,120 linear feet of stream within the Ohio-Wabash Lowlands Service area are located within 100 feet of agricultural fields; these linear feet of stream could provide opportunities for re-habilitation. Hotspots account for 2,222,880 linear feet of these potentially restorable streams within the service area. Approximately 3,865 linear feet of hotspots of potentially restorable stream are on IDNR-managed lands. Approximately 5,370 linear feet of hotspots of potentially restorable stream are adjacent to IDNR-managed lands. Bloomfield Barrens Managed Area is the IDNR-managed land with the most adjacent hotspots of potentially restorable streams (3,131 linear feet). The watershed with the most hotspots of potentially restorable streams is Pond Flat Ditch (HUC 051201130701 [Table 27]). The watersheds with the most hotspots (Tables 26 & 27) are the basis for stream and wetland mitigation priority areas. This program will focus on re-establishing and/or rehabilitating 15 acres of bottomland forested wetland and 7,750 linear feet of perennial streams within the priority areas of this service area. These goals are assuming the program will absorb 60% of the anticipated required mitigation within the first three years of the program.

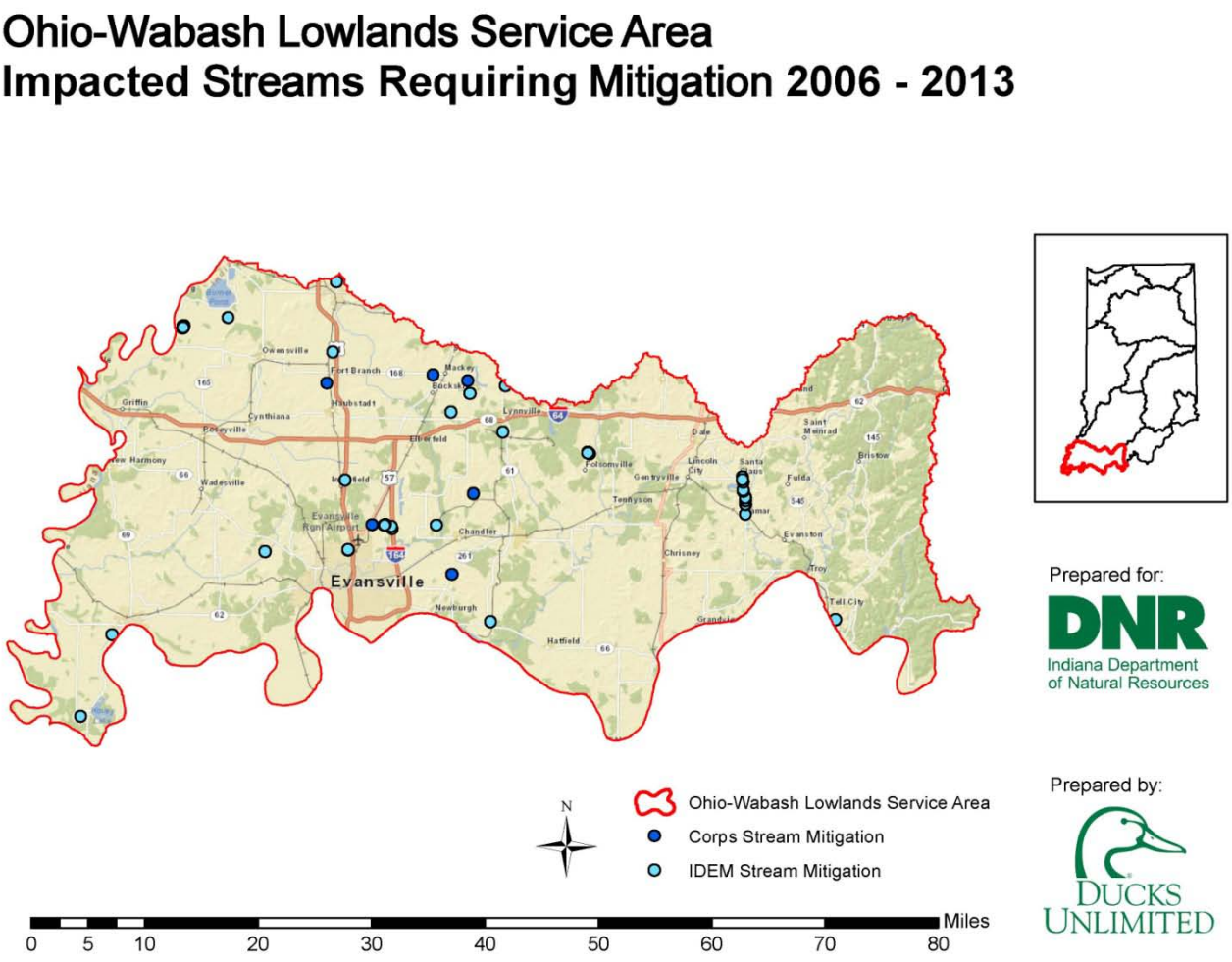


Figure 31. Impacted Streams Requiring Mitigation in the Ohio-Wabash Lowlands Service Area (2006-2013)

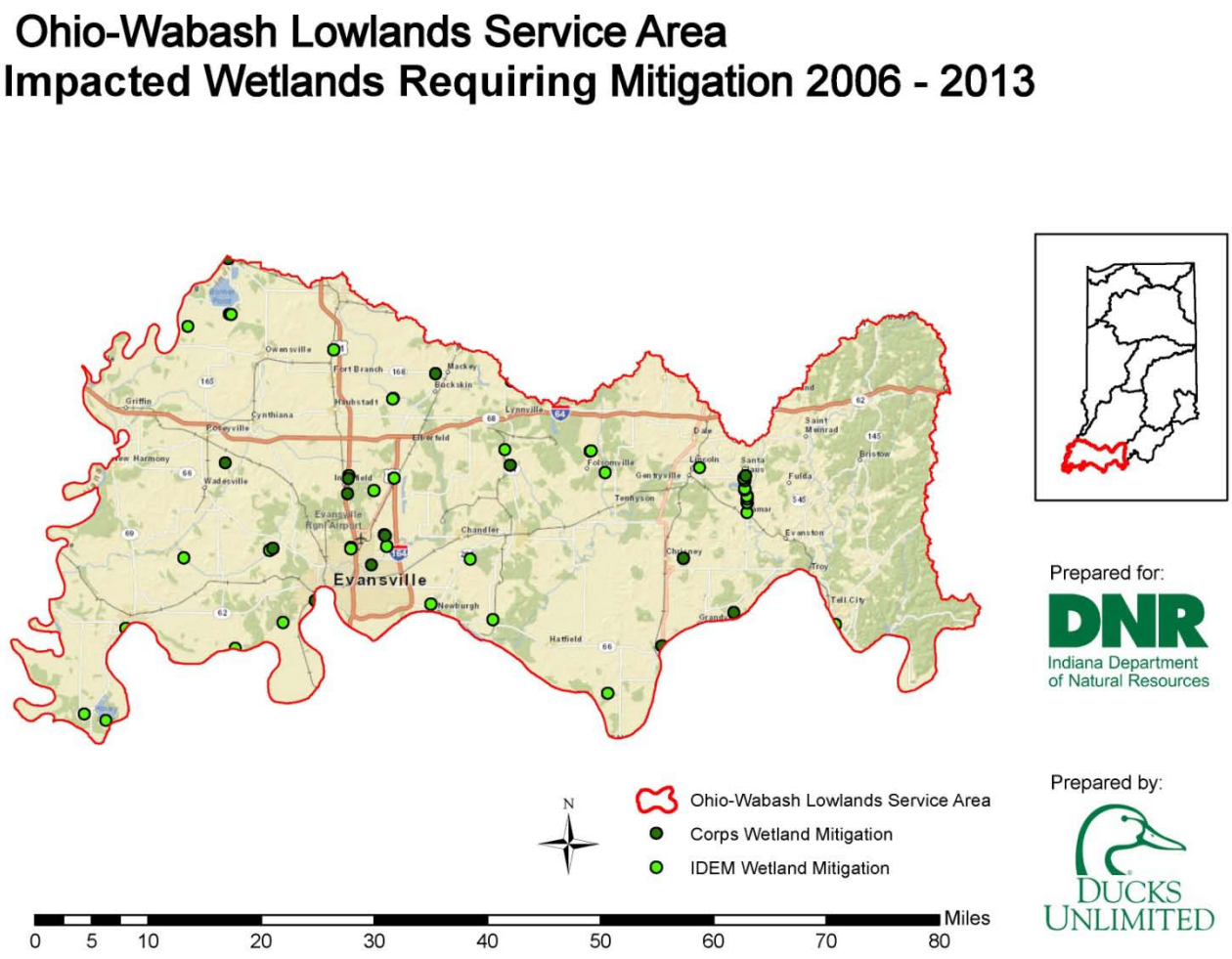


Figure 32. Impacted Wetlands Requiring Mitigation in the Ohio-Wabash Lowlands Service Area (2006-2013)

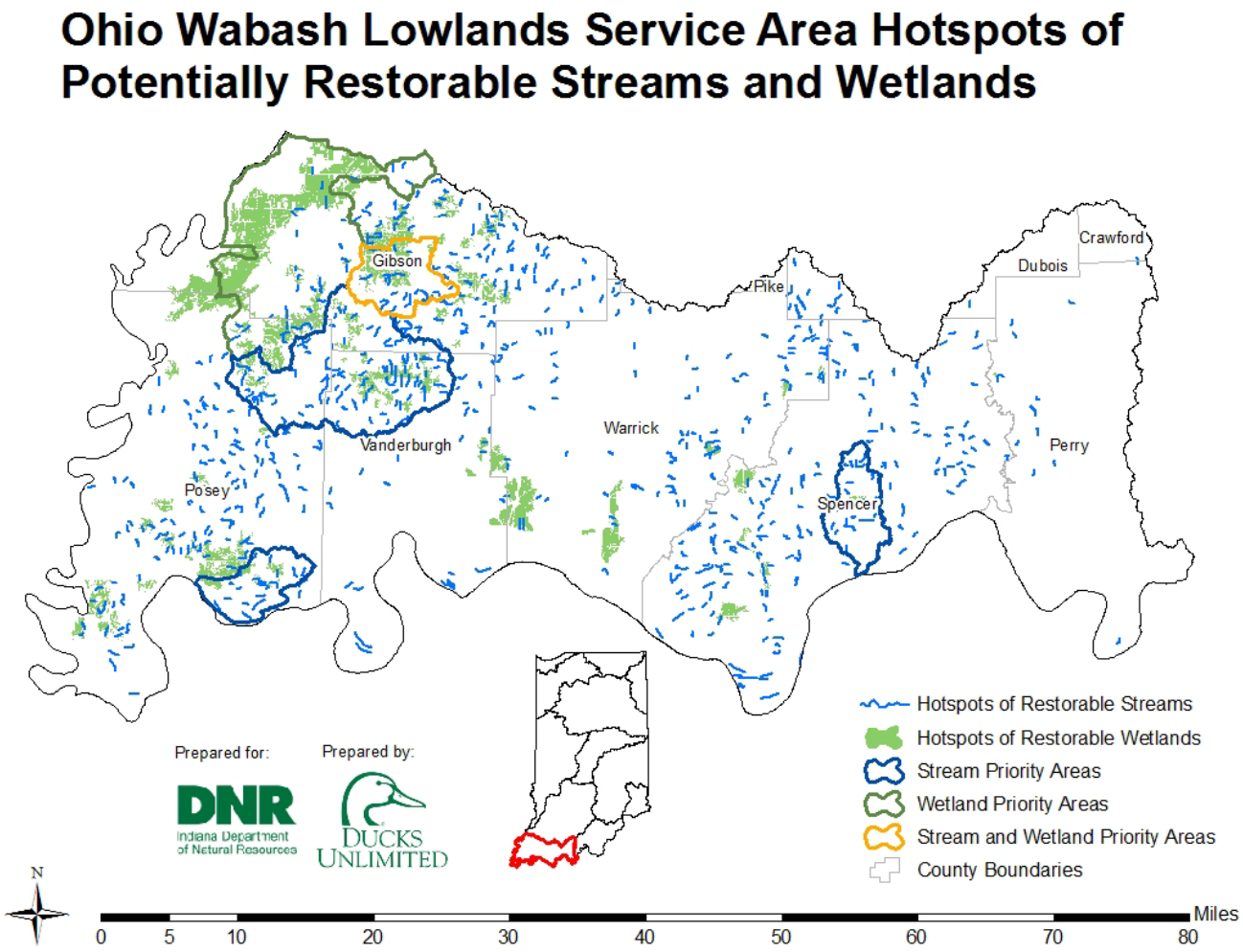


Figure 33. Hotspots of Potentially Restorable Streams and Wetlands in the Ohio-Wabash Lowlands Service Area

HUC 12 Code	HUC 12 Name	Hotspots of Potentially Restorable Wetlands (acres)
051201130305	Scott Ditch-Wabash River	8,973
051201130502	Headwaters Black River	6,480
051201130302	McCarty Ditch-Coffee Bayou	5,491
051201130501	Barren Creek-Higginbotham Ditch	5,029
051402020103	West Fork Creek	4,459

Table 26: Watersheds in the Ohio-Wabash Lowlands Service Area with the most hotspots of potentially restorable wetlands

HUC 12 Code	HUC 12 Name	Hotspots of Potentially Restorable Streams (linear feet)
051201130701	Pond Flat Ditch	126,720
051201130703	Caney Creek-Big Creek	119,328
051402020103	West Fork Creek	76,032
051402020603	Cypress Slough	64,944
051201130702	Neuman Lateral-Big Creek	64,944

Table 27: Watersheds in the Ohio-Wabash Lowlands Service Area with the most hotspots of potentially restorable streams

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APPENDIX C. COMPENSATORY MITIGATION PROJECT APPROVALS